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Chronology of KSC and KSC Related Events for 1982

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National Aeronautics and
Space Administration

John F. Kennedy Space Center



FOREWORD

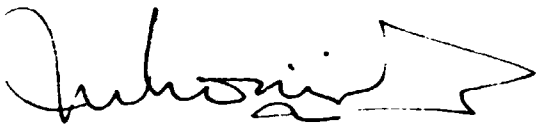
Orbiter Columbia was launched three times in 1982. STS-3 and STS-4 were development flights; STS-5 was the first operational flight carrying a crew of four and deploying the first two shuttle-borne satellites, SBS-C and ANIK-C. A number of communications satellites, using expendable vehicles, successfully launched.

Major changes in contracting were underway with procurement activity aimed at consolidating support services performed by 14 different contractors into a single base operations contract. EG&G, Inc., a Massachusetts-based firm, was selected as the base operations contractor.

This Chronology records events during 1982 in which the John F. Kennedy Space Center had prominent involvement and interest. Materials were selected from Aviation Week and Space Technology, Defense Daily, Miami Herald, Sentinel Star (Orlando), Today (Cocoa), Spaceport News (KSC), NASA News Releases, and other sources. The document, as part of the KSC history program, provides a reference source for historians and other researchers. Arrangement is by month; items are by date of the published sources. Actual date of the event may be indicated in parenthesis when the article itself does not make that information explicit.

Research and documentation were accomplished by Ken Nail, Jr., New World Services, Inc., Archivist; with the assistance of Elaine Liston.

Address comments on the Chronology to Information Services Section (SI-SAT-52), John F. Kennedy Space Center, Florida, 32899.

A handwritten signature in black ink, appearing to read 'M. Konjevich', followed by a long, horizontal, slightly wavy line that extends to the right.

M. Konjevich
Information Services

JANUARY 1982

January 4: Air Force and National Aeronautics and Space Administration space shuttle program officials are studying the possibility of conducting some shuttle launch servicing operations at NASA's Kennedy Space Center for initial Defense Department shuttle missions to be flown from Vandenberg AFB, California.

The purpose of the move would be to enable Air Force project engineers to focus on launch pad activities and software development and checkout in preparation for the first Vandenberg shuttle mission, scheduled for 1985. (AVIATION WEEK & SPACE TECHNOLOGY, 1-4-82, p. 22, Vol. 116, No. 1)

January 6: Three fuel cell generators have passed a critical inspection and will be re-installed in the space shuttle Columbia this week, the space agency reported, boosting chances for another launch as early as March 22.

NASA spokesmen said the fuel cell problem that forced the Columbia's second test flight to end three days early in November was not found in the two other generators that flew last time or in a replacement fuel cell.

The results of the inspection at the United Space Technology Corporation's Windsor Locks, Connecticut plant removed a major question mark from the schedules for the shuttle's remaining two flight tests.

The National Aeronautics and Space Administration said the three fuel cells were being shipped to the Kennedy Space Center at Cape Canaveral Monday from the Connecticut factory. They were to be installed in the reusable rocket plane Tuesday night. (THE MIAMI HERALD, 1-6-82, p. 3E)

<> The warning was clear to U.S. Sen. Lawton Chiles and NASA officials sitting by his side -- if space center wages are undercut in contract rebidding this year the Shuttle won't get off the ground.

Union leaders for workers at Kennedy Space Center pounded their message home Tuesday afternoon.

"We don't trust the government and we are suspicious...if you injure one, you're going to injure all of us. Not one bird is going to fly without organized labor," warned Andy Younger, a spokesman for the International Association of Theatrical and Stage Employees.

Camped at opposite ends of a T-shaped table in Brevard Community College's administration building in Cocoa, union and space agency officials argued the question of wage busting. The unions claim new federal regulations that govern the way contracts are bid could pave the way for non-union labor and lower wages.

But the discussions were mostly academic. Chiles and U.S. Rep. Bill Nelson, D-Melbourne, who practically served as referees, told the unions the new regulations are something they will have to live with.

Under revisions in the Service Contract Act the entire county, not just Brevard's government installations, will determine the prevailing wage rates when contracts are up for bidding.

If one company bids lower than the previous contract, it would be allowed to call a hearing to see if the workers' wages are in line with wages in the greater community.

Unions call this wage busting and Younger made an impassioned appeal to Chiles "for protection."

While Bob King, NASA's chief of industrial relations, said he could give no "iron-clad" assurances there wouldn't be some wage changes, he emphasized "wage busting is not our intent."

Chiles said he and Nelson had wanted a meeting between the parties and that even if the groups left as far apart in viewpoints as when they arrived, views were candidly aired.

"The fears are greater than the reality. What's needed is to set up a dialogue," said the Florida Democrat.

The one representative who didn't attend the meeting was someone from the Department of Labor, who drafted the revisions.

Said Chiles, "They were a no-show. Maybe they got the idea we were inviting them to a public hanging." Heads eagerly nodded in agreement from the union side of the table.
(TODAY, 1-6-82)

<> It was an overlooked particle of aluminum the size of a flea that started the chain reaction of events that grounded the multibillion dollar, 122-foot-long Space Shuttle during its second flight in November.

While NASA officials in Washington announced Tuesday their findings on the cause of flooding inside a Shuttle fuel cell, technicians at Kennedy Space Center successfully connected a peach-colored fuel tank with two booster rockets in preparation for the third flight.

The tiny speck of aluminum blamed for the fuel cell breakdown apparently clogged a suction tube that pulls water out of the area where oxygen and hydrogen create electricity.

"The water and the aluminum reacted together to form aluminum hydroxide -- a very corrosive element that ruined the cell," said James Kukowski, NASA spokesman. The speck apparently blocked a hole 1/21,000ths of an inch wide.

Kukowski said aluminum is a particularly reactive metal which can cause a great deal of damage under the right conditions.

He pointed to a space suit fire two years ago at Johnson Space Center "that may have been caused by contamination from a very small piece of aluminum and oxygen under pressure.

"It's ideal for construction but tiny particles of it are very difficult to find and can be a problem.

"Looking for these things is a matter of quality control," Kukowski said. (TODAY, 1-6-82, p. 12A)

January 8: The historic first two launchings of the Space Shuttle Columbia in 1981 contributed to a record-smashing year attendance at NASA's John F. Kennedy Space Center. Over two million people visited the KSC Visitors Center in 1981, by far the largest turnout recorded since the Visitors Center opened in 1966.

The two million visitors who viewed the various exhibits in the Visitors Center represented an increase of over 300,000 people from 1980's attendance figures. The attendance records for every month of 1981 were the highest figures for those months since 1973.

To accommodate the burgeoning influx of visitors, the Visitors Center will embark on a \$6.5 million expansion plan in 1982. Design reviews will be completed and ground-breaking for new facilities will begin early in the year.

Construction of a five-story Imax theater, one of the most unique movie theaters in the world, is scheduled to begin early this year, and is slated for completion in late 1983. (KSC NEWS RELEASE NO. 5-82, 1-8-82)

January 11: Martin Marietta Denver Aerospace of Denver, Colorado, has been awarded a multi-million dollar addition to its contract with NASA's Kennedy Space Center.

Martin Marietta will provide the hardware for the checkout, control and monitor subsystem in Firing Room 3 of KSC's Space Shuttle Launch Control Center, which is now being prepared for regular shuttle operations. The company will also provide some similar equipment for the shuttle Launch Processing System at Vandenberg Air Force Base, California.

The value of the contract addition is \$9,078,367, bringing the total value of the contract since 1975 to \$111,193,217. (KSC NEWS RELEASE NO. 6-82, 1-11-82)

January 12: They posed with wide-eyed children before popping flashcubes and they worked the crowd like politicians looking for a vote. A Shuttle crew returned to Kennedy Space Center on Monday.

Joe Engle and Dick Truly, the men who flew the Space Shuttle Columbia into Earth orbit in November, thanked "the troops" and said it was a valuable learning experience, despite the flight's problems.

"We learned 10 times as much with all the problems than had it been a vanilla mission," Truly said.

"Flying in space has got to be one of the biggest thrills anybody has ever had," he added. "This country is the only one in the world capable of building such a complex spacecraft."

As part of the official ceremony at KSC's Visitors Information Center, Shuttle Launch Director George Page unveiled a plaque -- complete with red, white and blue mission logo -- commemorating the flight.

It was an opportunity for Engle to quip, "I was dead sure you'd get down to 31 seconds to unveil the plaque and you'd announce we're going back to Houston; we'll do this next week."

The 49-year-old Engle was referring to the point at which the countdown stopped before the Columbia's second liftoff.

The astronauts also came with gifts -- a flag and crew patch that went aboard the Columbia.

And to space center workers, Truly said, "We couldn't have done it without you...nor the next one (flight crew) or the next one or the next one.

The Columbia's second mission was cut short by an electric power cell that went bad, and the astronauts both said they wouldn't mind another crack at flying the spacecraft.

Dr. Robert Gray, director of the Space Projects office, said "This flight was just as critical as the first flight and we knew we had a winner when they came back. We are well on our way to getting ready for the next flight and we think we're here to stay in this business."

From the Visitors Information Center, the astronauts were quickly hustled past crowds of tourists into an eight-door black limousine.

From there they toured the Shuttle hangar and launch control center technicians.

While some in the crowds were a little awed with the whole thing, there were those who expected something different.

"I expected they (the astronauts) would be a little taller," said George Sunshine, visiting from Fort Lauderdale. Not to be outdone, his wife Helen added, "Oh, I thought they'd be a lot younger looking." (TODAY, 1-12-82, p. 1A)

January 13: A fire-spewing helicopter borrowed Tuesday from the U.S. Forestry Service blackened brush and sent dense, dark smoke swirling over the Merritt Island Wildlife Refuge.

About 20 workers supervised the successful controlled burn of 4,000 acres, said Don Whitmore, fire information officer with the U.S. Fish and Wildlife Service.

Smoke billowed across the Indian River to Titusville, drifting on northeast winds.

Whitmore said the planned burning of the underbrush reduces the intensity of forest fires sparked by lightning or other natural causes.

Winter is normally dry and the county is already in the middle of a prolonged drought.

Clearing the dense vegetation also improves the wildlife habitat, enabling animals to roam more freely, he said.

Within the month, the fire officials hope to burn off 12,000 more acres, Whitmore said. Tuesday's burn area lies on the east side of the river, south of State Road 402. (SENTINEL STAR, 1-13-82)

January 15: NASA's John F. Kennedy Space Center has awarded a contract to Precision Fabricating and Cleaning, Inc., P.O. Box 69, Sharpes, Florida. The contract calls for PF & C to manufacture hydraulic and gaseous regulation panels to be installed in Space Shuttle operational areas at KSC and at Vandenberg Air Force Base in California. The manufacturing is to take place at PF & C's Sharpes facilities.

The fixed-price contract carries a \$54,921 price tag and covers the period from when the contract was awarded on December 17, 1981, until November 19, 1982. The contract is one that has been set aside for award to a small business firm. (KSC RELEASE NO. 10-82, 1-15-82)

January 16: Nature's scrimmage with the space agency ended with the thunderclap of rocket ignition Friday night at Cape Canaveral Air Force Station.

An RCA communication satellite, destined to provide expanded cable television service, was sent speeding into space at 8:54 p.m. after a close watch on wind conditions throughout the day.

Powerful winds at 30,000 feet forced a postponement of the satellite launch Thursday.

A crystal clear night, the sight of the 116-foot Delta forcing its way to the end of the Earth could be seen throughout Brevard County.

The nine solid-rocket boosters could be seen dropping away from the Delta rocket as tiny pinpoints high in the sky.

NASA launch officials said the cold weather during the past week did lower temperatures on the booster rockets, reducing their power somewhat. But it wasn't enough to keep the rocket from climbing to an altitude of 80 miles in just three minutes.

Once operational in late February, the RCA SATCOM IV will carry 24 color television transmissions to cable subscribers. RCA officials said seven of those channels were auctioned in New York last November.

It was the first time space age technology had ever been auctioned and it brought in \$90 million in bids as 53 firms competed.

"We have more potential customers than we can supply," said RCA executive Andrew Inglis.

The cost of the launch, satellite and insurance totaled about \$70 million.

SATCOM IV, like all communication satellites, will orbit 22,000 miles above the Earth. (TODAY, 1-16-82, p. 10A)

- <> Assembling the Space Shuttle for flight into Earth orbit is becoming easier and space agency engineers predict they'll launch the Columbia on its third mission during the week of March 22.

Engineers said Friday fewer damaged tiles and a familiarity with the spacecraft, borne from experience, are giving technicians an edge they didn't have between the first and second missions.

"We have a real good shot at it (late March launch). There is nothing we haven't done before," said Gene Thomas, Columbia project engineer.

Thomas predicted the Columbia would be moved to the Shuttle's assembly building February 5 and rolled out to the pad by February 21.

A date should be announced within two weeks.

If all goes according to schedule, the time it takes to prepare the reusable spacecraft from landing to liftoff will have been drastically reduced. (TODAY, 1-16-82, p. 10A)

January 18: NASA's John F. Kennedy Space Center has awarded a contract to the Holloway Corp., Route 2, Titusville, Fl. The contract calls for Holloway to supply 10 Direct Current Power Rack Assemblies for Space Shuttle launch facilities at

Vandenberg Air Force Base in California. The provisions of the contract are to be carried out at Holloway's Titusville facilities.

The fixed-price contract carries a price tag of \$136,770, and covers the period from the contract award date on January 14, 1982, until December 13, 1982. The contract is one that has been set aside for award to a small business firm. Holloway Corp. submitted the low bid out of three proposals received by KSC. (KSC RELEASE NO. 11-82, 1-18-82)

January 19: NASA's Kennedy Space Center has awarded a construction contract to New World Construction, P.O. Box 1827, Titusville, Fl. The contract calls for construction of a storage shed at the Space Center to shield oxygen bottles that are used for a variety of purposes from the elements.

The fixed-price contract is for \$38,334, and is scheduled for completion 120 days after a notice to proceed is issued. The contract, which was awarded January 12, 1982, was one set aside for award to a small business firm. New World submitted the lowest bid out of seven proposals received by KSC. (KSC RELEASE NO. 12-82, 1-19-82)

<> The fuel cell failure on the second Shuttle flight last November was a "one-time problem," caused by a sliver of metal in one of the cell's water aspirators, and will not necessitate any changes in the fuel cell units, NASA said last week. The faulty fuel cell as been replaced on Columbia and all three cells have been checked out and reinstalled on the Orbiter.

James Harrington, chief of Orbiter operations at Kennedy Space Center, said that NASA continues to aim for launch of the third Shuttle flight during the week of March 22, although he said the agency has a lot of testing to do. (DEFENSE DAILY, 1-19-82, p. 83, Vol. 120, No. 11)

January 20: Marshall's Induced Environment Contamination Monitor (IECM), a 1,000-pound package of ten instruments used to check the environment in and around the cargo bay of the Shuttle Orbiter for contaminants that could interfere with scientific equipment, has been serviced at Marshall

following its maiden flight on STS-2 and returned to Kennedy Space Center for the third Shuttle flight in March. In addition to its normal functions, the IECM during the STS-3 will be picked up by Remote Manipulator System to test the system's maneuverability. (DEFENSE DAILY, 1-20-82, p. 91, Vol. 120, No. 12)

<> RCA's latest communications satellite successfully powered into Earth's orbit Tuesday afternoon.

A rocket motor attached to SATCOM IV fired at 2:53 p.m. putting the satellite into an orbit that matches in time with the rotation of the Earth.

The orbit, 22,000 miles up, will keep the satellite over one spot on Earth.

RCA officials said they still have to position the satellite exactly where they want it and test onboard systems before it is operational in late February.

Launched Friday from Cape Canaveral Air Force Station aboard a Delta rocket, SATCOM IV will carry 24 color television transmissions to cable subscribers. (TODAY, 1-20-82)

January 21: The space agency has set March 22 as the official launch date for the space shuttle Columbia's third test flight, a week-long orbit around the earth.

Formal approval of the date that engineers have been aiming toward for several weeks came Wednesday from Major General James Abrahamson, the new chief of the rocket plane's development program.

Mission No. 3 will be flown by astronauts Jack Lousma, a 45-year-old veteran of the Skylab space station, and space newcomer Charles Fullerton, also 45.

Officials plan to launch the Columbia from Cape Canaveral at 10 a.m. EST. The reusable winged spaceship is to land at Edwards Air Force Base, California, at 10 a.m. PST March 29.

The shuttle will carry a variety of scientific instruments.

One instrument will measure magnetic fields generated by the spaceship. The fields could distort sensitive measurements of natural magnetic fields around the Earth.

Still another device will look for particles that might come from the shuttle in flight. (THE MIAMI HERALD, 1-21-82, p. 2A)

January 22: Visiting space enthusiasts had a rare opportunity to personally meet astronauts Dick Truly and Joe Engle last week as the crew of the second voyage of the Columbia gave their thanks to the KSC employees who got them off the ground last November.

An overflowing crowd of Spaceport visitors greeted the astronauts as they stepped into Theater No. 1 of the Visitors Information Center last Monday Jan. 11, invoking rippling cheers from the more than 300 people that packed the cavernous room waiting to see the space travelers.

"Nothing could make us happier than coming back to where we took off from," Truly told the audience. "I'm just sorry it took us two months to get back here."

It was well worth the wait for the astronauts as well as the audience.

In commemoration of the shortened but still historic flight, a plaque emblazoned with the red, white and blue mission symbol was presented to the two men by Shuttle Launch Director George Page.

"We learned ten times as much on this mission with all its adversity than we could have had on a vanilla mission with no problems," Truly said.

KSC officials on hand agreed with Truly's contention about the flight.

"We've learned a lot from you guys on this mission," said Dr. Robert Gray, manager of the Shuttle program office, to the two astronauts. "We think we're here to stay in this business."

To show their appreciation to the KSC launch team, Engle and Truly presented a plaque consisting of a flag and crew patch that flew in space to KSC Director Richard Smith on behalf of KSC workers.

"Here at Kennedy we've got absolutely the greatest launch team anywhere in the world," Engle said, presenting the gift. The plaque is to be permanently placed in the Launch Control Center to commemorate the mission.

Not to be outdone, Smith presented "with a great deal of pride" two framed photographs of the launch to the astronauts, and referred to the mission as a "learning experience."

After the ceremony, a smiling Engle and Truly posed for photos with visitors on the podium, and shook enough hands to melt the effects of the 30 degree weather blasting outside on that frosty afternoon. (SPACEPORT NEWS, 1-22-82, pp. 1 & 2, Vol. 21, No. 2)

<> Two Martin Marietta Corporation teams have been awarded Aerospace Awareness Panel Team Awards here recently.

Martin's Launch Equipment Test Facility Team received one of the awards for the team's efforts in isolating and correcting deficiencies in the Space Shuttle's Gaseous Oxygen Vent Hood system. The six-member team worked to support the NASA Design Engineering Directorate to complete a redesign of the vent hood in the time between the first and second Space Shuttle launches.

Members of the team are: Carl Fischer (team leader), Hugh Devlin, Charles Sweeney, Edward DeBusman, Robert McConnell and Delmar Henry.

The Martin TPS Repair Team was also honored with a team award. The team repaired the debonded thermal protection system panels on the external tank for the first Space

Shuttle launch. The team developed special repair techniques and timelines, allowing the launch schedule to proceed unaffected.

Members of the TPS team are: Cal Moser, Dick Jones, Lee Stewart, Ron Blackard, Dick Hare, Jerry Rucker, Chris Feagan, Terry Jones, Ray Kern, Andy Friday, Jim Mattheus, Phil Moody, Allie Hilton and Harry Driggers. Others are: Doug Powell, Carl Housman, Bob Bunch, Joe Bering, Max Taylor, Tom Levitt and Kevin Ely. (SPACEPORT NEWS, 1-22-82, p. 3, Vol. 21, No. 2)

January 24: An Apollo moon rocket lying on its belly in the shadow of the Space Shuttle's hangar may slowly rust away if it isn't moved, according to officials of the National Air and Space Museum.

But caretakers for the 364-foot-long rocket on loan to Kennedy Space Center say that's news to them -- especially since they recently completed an \$80,000 refurbishing job.

KSC's Saturn V rocket is one of three on display in the United States and because of their size, they all must be displayed outdoors.

The Saturn V displays are worth \$35 million each, said a spokesman for the Space and Rocket Museum in Huntsville, Alabama.

But museum officials, based in Washington, D. C., said Brevard's salt air may be eating away the display.

In a letter to U.S. Representative Bill Nelson, D-Melbourne, the museum's director wrote, "I need to take a good look at the current facilities and status of all the artifacts we now have on loan at KSC. For example I worry that the Saturn V might not be adequately protected for posterity in its current location outdoors."

Museum officials haven't decided where or when they will move the rocket but said they want some kind of enclosed exhibit.

Arnold Richman, KSC's visitors information director, said the museum's concerns about the rocket are "news to me." He said a six-month refurbishing job that included sandblasting, repainting and anti-corrosion work should stave off any deterioration.

Richman said when museum officials inspected the rocket in October, the work had not been completed.

He predicted the space center would add lecture tapes to the area around the rocket

Paul Hanle, chairman of the museum's space science department, said, "All of KSC's artifacts were examined and it was determined this one should probably be indoors. If we can build something here (at KSC) we certainly would."

On display since 1976, the Saturn V is built from excess rocket parts left over from the end of the Apollo program and parts used for testing during the race to the moon.

The other Saturn V displays are at the Johnson Space Center in Houston and Huntsville, Alabama. (TODAY, 1-24-82, p. 1B)

January 25: Satcom 4 last week was drifting toward its assigned 83 W. Long. orbital position following firing of the apogee kick motor January 19, which will place it into synchronous orbit, and deployment of its two solar arrays the next day.

The satellite was launched January 15 by a McDonnell Douglas Delta 3910/PAM into a 19,408 x 105-mile orbit following a one-day delay caused by high-altitude shear winds and the presence of a ship in the zone where Castor 4 solid propellant rockets were to impact. Performance of the nine Castor motors was slightly low because of the cold weather conditions here while the vehicle was on the launch pad. Temperature of the propellant in the motors was 17F below normal. Most of the performance decrease of the first stage was made up by the second stage, and apogee was 15 miles below nominal.

Following apogee kick motor burn, the 2,385-pound Satcom payload was in a 22,300-mile circular orbit at 103 E. Long. It is expected to reach its assigned longitude in February and will become operational for cable television relay late that month. Each of the 24 channels can carry an FM/color television transmission. (AVIATION WEEK & SPACE TECHNOLOGY, 1-25-82, p. 20, Vol. 116, No. 4)

January 26: The Reagan Administration will seek about \$6.5 billion for NASA's 1983 budget, a 9 percent increase over 1982, according to an internal memorandum prepared last Friday by the House Budget Committee staff.

At the funding level, NASA's glamor project, the Space Shuttle, will be kept on schedule and one of its most spectacular current scientific missions, Voyager, will be kept alive for its mission to Uranus and Neptune.

NASA's next big project, the \$700 million Galileo mission to Jupiter, is still scheduled to be launched in 1985 but will not arrive until 1989, a trip 30 months slower than an alternative launch plan under NASA consideration. (TODAY, 1-26-82, p. 1A)

<> Boaters going to or from South Florida and points north who have charted a course around an aging fender system on an Intracoastal Waterway bridge at NASA's Kennedy Space Center will soon find a modern concrete fender system in place.

A bridge repair contract has been awarded by KSC to Baker Marine Enterprises, Inc., of 7402 N. 56th St., Tampa, Fla. The contract calls for Baker Marine to overhaul an aging fender system on the Space Center's Haulover Canal Bridge, which forms a stretch of the Intracoastal Waterway system.

The fixed-price contract is for the amount of \$260,980, and is to be completed 180 days after the contract was awarded on January 21, 1982. The contract is one that has been set aside for award to a small business firm. Baker Marine submitted the low bid out of 10 proposals received by KSC. (KSC RELEASE No. 17-82, 1-26-82)

January 27: NASA's John F. Kennedy Space Center has awarded a supply contract to ITT's Surprenant Division, located at 172 Sterling St., Clinton, Massachusetts. The contract calls for ITT to furnish 15,000 feet of electrical power cable to replenish KSC's cable stock.

The fixed-price contract carries a price tag of \$41,250, and is scheduled to be completed 240 days after receiving orders to proceed. The work is to be performed at ITT's Clinton facilities. (KSC RELEASE No. 19-82, 1-27-82)

<> In a move designed to increase worker safety, NASA's John F. Kennedy Space Center has awarded a construction contract to Commercial Fire Sprinklers Inc., of 254 Fifth St., Orlando, Fla. The contract calls for the firm to install sprinklers and safety showers with eyewash units at KSC's Central Supply Building.

The fixed-price contract has a value of \$27,705, and is to be completed 90 days after the contract was awarded on January 20, 1982. The contract is one that has been set aside for award to a small business firm. Commercial Fire submitted the low bid out of six proposals received by KSC. (KSC RELEASE No. 20-82, 1-27-82)

January 28: For those of us who have been vitally interested in the U.S. manned space program from its very inception, it is difficult to realize that it has been well over 20 years since the original, seven-member astronaut corps was selected.

Donald "Deke" Slayton, one of those bright, close-cropped young men selected in 1959 to fly America's first space missions, announced in Houston yesterday that he plans to retire from the space program before his 58th birthday on March 1.

He is a guy who has both given a lot to and received a lot from the space program. His true love of and dedication to the program was demonstrated by his willingness to stick with the program for many years after it appeared he might never get to fly in space. Although he was slated to be the second astronaut to fly, a heart problem knocked him out of

that mission. He held onto the dream of making a space flight and 10 years later was found physically fit to fly this country's only international space mission, the Apollo-Soyuz test project in July 1975.

Thanks, Deke, and best of luck. (TODAY, 1-28-82)

<> Many years ago when tourists were shown the inside of the massive Vehicle Assembly Building they made futile attempts to take souvenir photographs of the endless dark corners with the aid of a puny flashbulb on an instamatic camera.

Today, a remodeled lighting system in the VAB is winning awards throughout the United States and Canada.

In a competition sponsored by the Illuminating Engineering Society of North America, the VAB system was triumphant over 32,000 other commercial entries in the final judging in Toronto last August. The VAB lighting system was cited for excellence of design and technical engineering, the innovative approach to the task of efficiently illuminating such a building and for maintaining a large safety factor for the electricians who installed the system.

The VAB lights were changed because of the switch from the 36-story Saturn V to a shuttle vehicle only half as tall. The requirements were different and there was also a need to become energy conscious.

In a ceremony on January 28 in Orlando, a certificate of merit, given for winning over all U.S. entries, and certificate of special citation, given for the final win in Toronto, was presented to NASA by Michael Ciska of Hubbell Lighting Corp., W. Va., the company that manufactured the system. Peter A. Minderman, Director of Design Engineering, accepted the awards for NASA. In addition to the internal engineers and staff at KSC, others involved in the work include design by Russell & Axom Architects and Engineers, Daytona Beach; engineering by Hubbell Lighting and Sylvania Lamp Division; and installation by United Electric, Daytona Beach. (SPACEPORT NEWS, 2-5-82, p. 4, Vol. 21, No. 3)

FEBRUARY 1982

February 1: Before he pushed the button that would send John Glenn orbiting the earth, Tom O'Malley paused. He wanted to say something to the young astronaut in the Mercury capsule who was about to make history. No more technical lingo, no more instructions. Just a wish of goodwill, from one man to another.

"May the wee ones be with you John," said O'Malley, then vice president and general manager of launch operations at Kennedy Space Center for Rockwell International Corp. "Good Lord," he prayed, "ride all the way!"

Glenn never forgot the message from "that dyed-in-the-wool Irishman" who sent him 'round the world. And on the recent occasion of O'Malley's retirement, Senator Glenn (D-Ohio) recounted that now-infamous message via telegram.

Because O'Malley is a man to be remembered.

Sometimes with love, sometimes without. As a saint, as a tyrant, as a doer and a mover. Always with respect, always with admiration -- and always as a man worth knowing.

"Whatever you hear that's good about me, it isn't true," quipped O'Malley, 66, who was involved in 14 manned launches including the world's first Space Shuttle mission during his aerospace career. "These people don't know what they're talking about."

O'Malley, known for his tough-talking, hard-working brand of success, was honored Friday, January 29, at a retirement party and reception hosted by Rockwell and held at the social hall of Our Savior Catholic Church in Cocoa Beach.

"I'm happy to be retiring and I've been very happy with my career," he said. "The Lord blessed me with the family I had to grow up in. There were a lot of us, so we learned to work early, we learned to work hard and we learned to work together."

O'Malley, who graduated in 1937 with a bachelor's degree in mechanical engineering from the Newark (N.J.) College of Engineering, joined Rockwell in 1967, first as manager of Apollo/Command Service Module Operations at KSC, then promoted in 1970 to his most recent position. He first worked for the Curtis Wright Co. in New Jersey until he joined General Dynamics Corp., a move which brought him to Kennedy Space Center.

Among the more than 200 friends, family members, community leaders and Rockwell employees and executives that attended the reception were: Major General (USAF ret.) David Jones, former commander of the Air Force Eastern Test Range; Dr. Maxwell King, president of Brevard Community College; Sy Rubenstein, vice-president and program manager for Orbiter production at Rockwell and master of ceremonies for the evening; John Cannon, president of Barnett Bank; Nancy Rock, public relations director at Cape Canaveral Hospital; Paul C. Donnelly, vice president of United Space Boosters, Inc., and his wife, Marge; Cocoa Beach stockbroker Dale Holzen; Jack Korenblit, president of the Florida Association of Realtors; Chuck Hollinshead, public affairs director for KSC, and his wife, Linda; George Faenza, McDonnell Douglas executive; John Janokaitis, NASA official and Al Reeser, general manager of launch operations, who replaces O'Malley. (TODAY, 2-1-82, p. 1D)

- <> America's aerospace giants have locked fists in what promises to be a spirited arm wrestle for a multimillion dollar contract to prepare the Space Shuttle from one launch to another.

Since November, teams of aerospace company executives have been quietly observing, taking notes and reporting back to their corporate headquarters on Shuttle processing at Kennedy Space Center.

Some of the eight firms, such as outsider Grumman Aerospace, are unafraid to talk about this Shuttle sweepstakes while the well-entrenched Rockwell International is keeping its plans secret.

By early 1984, one company, possibly working with several others in a team, will do the work of seven major firms preparing the Shuttle for its routine airline-style flights into space. And for the most part the firms outbid will be left out in the cold.

Only one of the firms -- General Dynamics Corp. -- has dropped out of the running, pulling back its team at the space center.

Essentially, there are two keys to winning this contract -- making the Shuttle an efficient, dependable operation and doing it at the best possible price.

NASA is looking forward to a 20 percent or more savings over current operations, said Andrew Pickett, manager of the space center's advanced planning and technology office.

Most of that savings will come from maintaining the work force at the same level despite the addition of two more Shuttle Orbiters, Pickett said.

But the biggest part of turning the Shuttle into a workable transportation system is launching the ship into orbit with commercial and military cargo.

The final contract decision will be made by NASA Administrator James Beggs in mid-1983.

Despite what some are calling a horse race, contractors already on the job and interested in the new contract have cooperated with the challengers.

Some of the firms that lose out on the Shuttle Processing Contract may work with the winner as a team, but executives say somebody is going to be left out of the largest aerospace program in this quarter of the century.

The Shuttle Processing Contract isn't the only move toward consolidation at KSC.

A single contract will be awarded late this year for operating the space center and third contract will be awarded for cargo processing in 1984.

A total of 26 contractors will be consolidated into three main contractors. (TODAY, 2-1-82, p. 1A)

<> Successful launch of the European Space Agency Ariane vehicle last month has intensified competition between this vehicle and the NASA/McDonnell Douglas Delta to orbit communications payloads in the 2,000-2,500-pound weight class.

The National Aeronautics and Space Administration is being forced to ease rules that require choice of vehicle method 30 months prior to launch date. In addition, the agency may be forced to consider ways to lower the Delta launch price to customers as a means of being more competitive both to Ariane and the space shuttle.

One NASA official said Delta is the only one of the three launch methods where the launch price a customer pays must equal the cost to NASA.

He was referring to the fact that both Ariane and shuttle launches are heavily subsidized, while NASA is reimbursed fully for Delta launches. (AVIATION WEEK & SPACE TECHNOLOGY, 2-1-82, p. 50, Vol. 116, No. 5)

February 2: NASA's John F. Kennedy Space Center has awarded a supply contract to Specialty Maintenance and Construction, Inc., of 4330 Drane Field Road, Lakeland, Fla. The contract calls for 23 hypergolic fuel "vacuum cleaners" to be supplied to the Space Center. Hypergolic propellants are used to power some onboard systems of NASA's Space Shuttle Orbiter.

The fixed-price contract has a value of \$147,114, and is to be completed by November 15, 1982. The contract, which was awarded on January 26, 1982, is one that has been set aside for award to a small business firm. Specialty Maintenance submitted the low bid out of six proposals received by KSC and will carry out the provisions of the contract at their Lakeland facilities. (KSC RELEASE NO. 21-82, 2-2-82)

February 3: Martin Marietta Aerospace has been awarded a \$9.1 million contract addition for ground computer checkout systems for the Space Shuttle launch site at Kennedy Space Center. The firm will provide hardware for checkout, control and monitor systems in firing room three at KSC's Space Shuttle Launch Control Center.

The equipment will be built at the firm's Denver facility. Installation is scheduled to begin in June. (TODAY, 2-3-82, p. 14C)

<> A 3 million-mile journey began at the stroke of midnight Tuesday as the Space Shuttle Columbia was moved from its hangar at Kennedy Space Center to the building where it will be attached to the fuel tank and booster rockets.

Originally planned for Thursday, the Columbia's journey from its hangar to the Vehicle Assembly Building was moved ahead one day after technicians were able to finish repair to heat protection tiles.

A tractor with huge tires, each weighing 183 pounds, transported the Columbia the 300 yards from the hangar to the garage in just 18 minutes.

Space center workers applauded and cheered as the 100-ton Columbia was carefully eased out of its hangar tail first. Alongside the Columbia, camouflaged soldiers with M-16 rifles and guard dogs peered at spectators lined up against the barricades and ropes.

Inside the 52-story garage, the entire Shuttle stack -- fuel tank, booster rockets and spaceplane -- will be assembled.

Total tile repairs were far less for this flight than the two previous, space center spokesman Mark Hess said. He pointed to only 469 tiles removed since the Columbia last landed in November to the 1,500 tiles removed after the first flight.

Several tiles were damaged during the Columbia's last tow to its garage when a forklift brushed up against the ship's rear. This time, the tiles were unharmed.

"We've learned more about maintaining the Shuttle every time we go through something like this," Hess said.

Later today, preparations will begin to hoist the Columbia above the 100-foot-high bullet-shaped fuel tank and booster rockets.

After the Shuttle is fully assembled, it will be moved to the launch pad by February 21. (TODAY, 2-3-82, p. 12A)

February 4: A miniature greenhouse has been delivered for integration with the payload of the third Space Shuttle flight, scheduled for the week of March 22.

Called the Plant Growth Unit, the compact greenhouse is managed by Dr. John Tremor and Ronald Mancini, both of NASA's Ames Research Center, Mountain View, California, in conjunction with the principal investigator, Dr. Joe R. Cowles of the University of Houston.

Tremor delivered the primary unit to NASA's Kennedy Space Center, Florida, where Shuttle payload integration is taking place. A backup unit was delivered to Cowles for his experimental use. (NASA NEWS RELEASE NO. 82-15, 2-4-82)

<> As dawn broke Wednesday at Kennedy Space Center the Shuttle Columbia was being raised by two powerful cranes and dangled just a few feet above the floor of the Vehicle Assembly Building.

Through the early morning about a dozen technicians painstakingly attached a steel sling around the front and back of the 100-ton plane. Then, with the aid of a crane that can lift more than twice that weight, the Shuttle will be lifted the height of a 19-story building early today.

/Mark/ Hess /NASA spokesman/ said the lifting is the easy part, lasting only 10 minutes. Through mid-Friday, workers do the hard job -- fitting the hundreds of electrical and mechanical connections between the candle-shaped fuel tank and the two booster rockets.

Hess said the difficulties before the last launch aligning the spaceplane with the fuel tank will be corrected by the introduction of some new tools.

Compared to Shuttle processing before the second launch, the Columbia's refurbishing this time around was cut by 35 days.

Most of that time savings was due to fewer repairs needed for the fragile heat protection tiles. (TODAY, 2-4-82, p. 16A)

February 5: The third launch of the Space Shuttle Columbia from the Kennedy Space Center, Florida, has been set for March 22, 1982, at 10:00 a.m. EST.

The crew for the third Shuttle mission, STS-3, is Jack Lousma, commander, and C. Gordon Fullerton, pilot.

Objectives of the STS-3 flight, the third in a series of four development flight tests, will be to continue engineering evaluation of the reusable spacecraft with particular emphasis on its thermal characteristics. In Columbia's cargo bay will be a space science payload (OSS-1) with astronomy and space plasma physics instruments. Also in the bay will be the Canadian-built remote manipulator arm which will be extensively tested for the second time.

Following seven days and three hours in Earth orbit, the Columbia is scheduled to land on the dry lake bed at Edwards Air Force Base, California, on March 29, 1982. (NASA NEWS RELEASE NO. 82-20, 2-5-82)

<> Widows of two Space Shuttle workers killed in 1981 by toxic gas filed separate lawsuits Friday/Feb. 5/ that seek more than \$25 million total from NASA and two other agencies involved in the accident.

Barbara Bjornstad of Titusville and Nancy Cole of Merritt Island sued in federal court naming NASA, Pan American Airways and Wackenhut Services, Inc., a security agency.

The suits contend all three agencies failed to take necessary precautions that could have prevented the men from entering the Shuttle's nitrogen-filled aft chamber March 19.

That day, the aft chamber was supposed to be filled with air. The men, part of a five-member crew from Rockwell International hired to check out the Orbiter's rocket machinery, had received clearance to enter.

Rockwell technician John Bjornstad, 51, died the same day and Forrest Glenn Cole, 50, died two weeks later at Shands Teaching Hospital in Gainesville. The three other technicians were treated and released.

Federal investigators determined that NASA and Rockwell were at fault.

The suit states that NASA was negligent in failing to notify the men that pure nitrogen was in the Shuttle chamber, that Wackenhut failed to provide security, and that Pan American failed to provide adequate medical facilities at the Kennedy Space Center. (TODAY, 2-6-82, p. 1B)

<> The mating of the space shuttle Columbia to its external fuel tank was ahead of schedule Friday /February 5, 1982/ as Kennedy Space Center workers readied the orbiter for its third test mission in March, NASA officials said.

After running into trouble refurbishing the shuttle after its first mission last March, NASA workers developed some new tools to help them "mate" the orbiter with its fuel tank, said National Aeronautics and Space Administration spokesman Mark Hess. "It was a troublesome spot for us last time. Between the two missions we looked at it hard and came up with some new tools to help us with this mating process," he said.

Hess said Friday that the hookup crew was 16 hours ahead of where it was during the mating process for the second mission.

He said the shuttle would be fired up today for seven days of dry-run tests. Late Thursday night, the spacecraft was hoisted, nose up, into launch position inside the Vehicle Assembly Building.

Workers then tightened the bolts and finished the mechanical job of placing "metal on metal" Hess said. Next, they began the critical job of hooking up the "umbilical lines" -- the lines that carry fluids, gases, propellants, communications and data links between the orbiter and its tank.

At the end of the week, Mission 3 astronauts Jack Lousma and Gordon Fullerton will arrive for the simulation tests.
(SENTINEL STAR, 2-6-82)

- <> Calling himself a "NASA groupie," Vice President George Bush officially welcomed Spacelab, the \$1 billion, European-built space shuttle laboratory to the United States.

In a speech to about 300 American and European space workers and dignitaries on Friday /Feb. 5/, Bush said: "I often say that we're doing our best to bring down the inflation rate, to bring down the interest rates, and the only thing we want to see go up is the next space shuttle."

The space shuttle is scheduled to lift off on its third mission March 22.

NASA Administrator James M. Beggs lauded the Europeans' "splendid achievement" and said the United States looked forward to working with them in "the spirit of mutual development."

Built by the European Space Agency, a consortium of 10 Western European nations, Spacelab has been hailed by NASA as the crowning piece of hardware for the shuttle.

Dr. Johannes Ortner, the Austrian chairman of the Spacelab program, said, "We are grateful to the United States and NASA for having provided Europeans with the opportunity to design and construct this important part of the space transportation system.

"We look forward to being a real and serious partner" with the United States "for future space voyages," he said.

After Bush's brief comments, the vice president toured Spacelab, posed for photographs, and joked with the European and American scientists who will ride the shuttle.

Wearing a sky blue Spacelab jacket, the vice president smiled and greeted the Dutch scientist Wubbo Ockels, saying, "Let me give you the basic American political handshake."
(SENTINEL STAR, 2-6-82)

February 7: Two weeks of critical tests on the Columbia's electrical connections got under way yesterday as space officials prepared for the space shuttle's third launch, scheduled for March 22.

"We want to check out that all the links are as they should be," said a spokesman for the National Aeronautics and Space Administration (NASA).

Scrutiny of the connections between the orbiter and the external fuel tanks is the first item on the list of check-ups that must be completed before the shuttle can be moved to the launch pad February 21, he said.

On Friday, NASA spokesman Mark Hess said space agency workers were moving faster than expected to prepare for the third launch.

The crew mating the shuttle to its huge external fuel tank was running 16 hours ahead of the pace it set on the second Columbia mission, Hess said. The speedup was attributed to tools developed for the task and to the experience of workers.

Vice President Bush announced the launch date at a Friday ceremony dedicating the European-developed Spacelab, which is scheduled for a September 1983 launch on the shuttle. (PHILADELPHIA INQUIRER, 2-7-82)

<> Space shuttle technicians, running two days ahead of schedule Sunday in preparations for Columbia's third launch, were delighted at the news that they won't be out of work any time soon.

Under President Reagan's proposed budget sent to Congress on Saturday, the National Aeronautics and Space Administration will get \$6.6 billion for the next fiscal year -- an increase of \$673 million or 11 percent. The space shuttle will get the biggest slice of the pie, with \$3.5 billion. (THE MIAMI HERALD, 2-8-82, p. 6A)

February 8: An extensive power check of all space shuttle components began Monday /Feb. 8/ in preparation for mock orbital and landing maneuvers by its astronaut crew this weekend.

Propellant, gas, electrical and communication links between Columbia and its external fuel tank and rocket boosters are being tested at the Vehicle Assembly Building to ensure their readiness.

Astronauts Jack Lousma and Gordon Fullerton are due at the space center by midweek to prepare for their simulated flight tests -- orbital entry, an emergency return to Earth and a normal atmospheric reentry and landing. The tests are expected to take place Friday and Saturday in the assembly building.

The "turnaround time" between Columbia's second flight and its third mission was still ahead of schedule and space agency officials were considering the possibility of moving the shuttle out of the building to the launch pad several days ahead of the original plan., said center spokesman Rocky Raab.

"In fact we will soon be almost four days ahead of schedule and a possible rollout to the pad is under consideration for February 17," said Raab.

The shuttle's next blastoff is scheduled for 10 a.m. March 22. (SENTINEL STAR, 2-9-82, p. 6-C)

February 11: A simulated launch mission of the space shuttle Columbia was aborted shortly after it began Thursday because of technical difficulties with a computerized system that runs the program.

Space center officials rescheduled the mock mission for Thursday night while technicians tried to find the problem in the "shared peripheral area" of the launch processing system, said space center spokesman Rocky Raab.

The system is only used for simulations and would not have affected an actual launch, NASA officials said. It was not immediately determined whether the problem would cause any delay in the series of tests being carried out in the Vehicle Assembly Building.

Rollout to the shuttle launch pad has been scheduled for Tuesday, with the beginning of Columbia's next mission set for 10 a.m. March 22.

Space shuttle technicians said Thursday that they will be able to move the shuttle to its oceanside launch pad next week despite a hydraulic leak and a faulty mechanical arm on the twin rocket boosters.

Raab said technicians will repair the leak and replace a 53-inch-long arm that steers the nozzle actuator of the booster rocket in flight. He said the repairs should be completed within the next two or three days.

"These problems won't hurt the rollout a bit," said Raab. "It will just force us to reshuffle some of our tests. But the end result is that nothing changes."

Raab said a crew of backup astronauts, Don Williams and John Lounge, were in the crew compartment Thursday and had just passed the simulated T minus zero or blastoff time when the computerized system failed.

"They will have to find the problem, rewrite it (into computer software), test it and recycle the whole thing," said Raab.

"We only use this launch processing system in running simulations," he said. "It is a computer program that fools the orbiter into thinking it's moving. It glitched out about a minute into the flight and now will have to be reprogrammed."

Despite the problems, Raab said the fully assembled shuttle would be rolled from its towering Vehicle Assembly Building to the launch pad at 5 a.m. next Tuesday, a day earlier than planned. (SENTINEL STAR, 2-12-82, p. 5-C)

<> Kennedy Space Center technicians have a light schedule today because work has gone smoothly preceding the three-mile rollout of the Space Shuttle to the launch pad Tuesday.

Their only task today is to install explosive devices on the solid rocket boosters that will ignite the motors separating the boosters from the external tank after liftoff.

"They'll install explosive devices and that's it" until the rollout, KSC spokesman Rocky Raab said Saturday.

The Shuttle's third mission is still scheduled for March 22 and no complications are expected before rolling the spacecraft from the Vehicle Assembly Building to Launch Pad 39A at 5 a.m. Tuesday.

Saturday was a "catch-up day" for workers who finished minor work on the Shuttle, Raab said.

Included in Saturday's tasks was attaching of an actuator, a 54-inch part that moves the rocket nozzle for steering. The device had been installed earlier in the week, but not completely attached. (TODAY, 2-14-82, p. 19A)

February 17: Following a rigid time line, punctuated by exotic sounding milestones, men and women involved in the space shuttle program have been busily working since late last year to ready America's reusable spacecraft for its third trip into space.

On November 14, the Space Shuttle 2 mission ended when the orbiter Columbia touched down on a dry lake bed in Dryden, California. For the next 10 days, the ship was prepared for its piggyback ride atop a 747 aircraft back to the Kennedy Space Center. After landing in Florida, the Columbia was hoisted off the 747, its landing gear was deployed and it was towed into the processing facility.

The main landing gear tires were pulled off during turnaround activities for cold soak tests. Because the orbiter is expected to get very cold during the next mission, engineers wanted to expose the tires to extremely low temperatures to make certain they would withstand such an environment. Hundreds of other systems and components were thoroughly checked out and tested.

The scientific package that will be aboard the next mission was inserted in the orbiter's cargo bay. This included a space science payload with astronomy and space plasma physics instruments.

While all of this was going on in the orbiter processing facility, another assembly operation was taking place in the vehicle assembly building, some 300 yards away. There, the external tank and the twin booster rockets were being assembled, (stacked), and finally mated. The main tank on the next mission will not be painted white as in previous missions but will instead show off the natural butterscotch color of the spray-on foam insulation. By leaving off this one coat of paint, the unit will save about 600 pounds of weight.

After the orbiter was towed into the vehicle assembly building, a large handling sling was attached to the front and back of the orbiter, and the 100-ton vehicle was raised several inches off the floor for a final inspection of the landing gear and wheel wells. It was then raised to a full vertical position and then, suspended by a single 250-ton crane, the craft was lifted vertically 190 feet above the floor to a point where it was joined to the main tank, which was sandwiched between the two booster rockets.

All over the space complex were signs announcing the number of days until rollout. Scheduled rollout for the next mission was Friday, February 19, at which time the entire assembly composed of the orbiter and the lifting rocket package would be rolled to the launch pad 39A some 3 1/2 miles away. However the rollout was moved up to Tuesday, February 16.

During 1983, a shuttle mission will transport the spacelab to orbit and return it to earth. Spacelab is the product of the European Space Agency which is a combination of 10 European nations. The hardware was formally delivered to NASA on February 5 in ceremonies at the Kennedy Space Center with Vice President George Bush accepting the versatile orbital research center on behalf of the U.S.

The spacelab is a flexible laboratory system that features several interchangeable elements that can be put together in various configurations to meet the particular needs of a given flight. The major elements are a habitable module in which scientists can work in a shirt-sleeve environment, and platforms called pallets which can be placed in the shuttle cargo bay behind the module. These pallets will hold instruments requiring direct exposure to space.

In accepting the unit from the Europeans, Vice President Bush commented that "we will take tender loving care of it and be shooting for a 1983 launch." Flying the mission for the U.S. will be astronauts Owen Garriott and Robert Parker. Garriott was science-pilot for Skylab-3 in 1973. Parker has not yet flown in space.

Approximately 400 officials, contractors, NASA personnel, and members of the press attended the Spacelab arrival ceremony.

The third space shuttle mission is currently running ahead of its projected timeline, and barring major problems, at 10 a.m., Monday, March 22, the 4 1/2-million pounds of man and machine will thunder off the launch pad with astronauts Jack Lousma and Gordon Fullerton aboard. Following seven days and three hours in Earth orbit, the Columbia is scheduled to land at Edwards Air Force Base in California on March 29.

It will be a spectacular mission and its success will depend, in large part, on those that were involved in the turnaround. (THE MONADNOCK LEDGER /New Hampshire/, 2-17-82)

- <> NASA is planning to use about 3,000 new lightweight insulation tiles on the third Space Shuttle Orbiter, Discovery (103), which will add about 3,500 pounds of payload capability to the vehicle. The new tiles will weigh 12 pounds per cubic foot, versus 22 pounds for the current tiles. There are about 30,000 tiles on an Orbiter. The fourth Orbiter, Atlantis (104), will make more extensive use of the new tiles. Discovery is scheduled for delivery by Rockwell to NASA in the fall of 1983; Atlantis, in late 1984. (DEFENSE DAILY, 2-17-82, p. 245, Vol. 120, No. 30)

- <> The mated Space Shuttle Columbia, mounted on a mobile launch platform riding on a crawler vehicle, was successfully moved from the Vehicle Assembly Building at Kennedy Space Center to Launch Pad 39-A, at KSC, where it is scheduled to make its third flight March 22. The 3 1/2-mile trip to the pad began at 4:21 AM EST and was completed at 12:10 PM. The move started 39 minutes early to avoid a storm predicted yesterday afternoon. (DEFENSE DAILY, 2-17-82, p. 242, Vol. 120, No. 30)

February 18: Work crews rechecked connections between the space shuttle's launch platform and ground systems Wednesday in preparation for a launch countdown dress rehearsal.

"We're making sure everything is hooked up and in working order before the start of the dry countdown demonstration test," said Kennedy Space Center spokesman Mark Hess.

NASA officials said there was a slight possibility the launch date could be moved up two or three days because everything had gone so smoothly until now.

Jack Lousma and C. Gordon Fullerton, prime crew for Columbia's third mission, scheduled for March 22, were set to imitate launch day procedures, engaging in flight and landing maneuvers this morning aboard a special Gulfstream trainer rigged up to simulate the space orbiter.

The test -- called a dry countdown because no propellants are loaded aboard the shuttle -- helps time sequence of pre-launch activities involving the astronauts and others. It ends after the make-believe liftoff at 10 a.m. Friday.

The next major step in preparations for the third mission will be the test loading of supercold liquid fuels into the huge external tank on February 26. That will be followed a week later by the loading of propellants in the orbiter's maneuvering system and power units.

Preparations will then begin for a final countdown.
(SENTINEL STAR, 2-18-82, p. 2-C)

February 19: "Blueprint for Survival" has been the theme for KSC's observance of Black History Week which concludes today.

Activities during the week planned to enlarge KSC employees' awareness of the contributions Black Americans make to our culture and shared heritage.

The principal events for the week included a special Black History Week menu served in all cafeterias, a film, "Heritage in Black," and a concert, "From Bach to Gospel," given by the Bethune-Cookman College Concert Chorale.

Adding significance to this year's observance of Black History Week was the creation of a new employee organization named the Black Employees Strategy Team (BEST). This group of 11 Black men and women was formed to monitor the overall climate of the Black work force at KSC.

The BEST representatives were elected by Black employees and the group is co-chaired by Evelyn Johnson and Sandra Rayner and will seek to promote equality and opportunities for Blacks in all phases of work.

Advancement, recognition of accomplishments, plus developing a stronger bond with the Black community for the recruitment and participation of Black students in KSC programs are the primary goals of the BEST.

BEST members will serve as KSC's representatives in the community to teach Black youth how to prepare for the job market. (SPACEPORT NEWS, 2-19-82, p. 4, Vol. 21, No. 4)

<> A dense fog Thursday morning temporarily grounded training exercises for Shuttle astronauts Jack Lousma and Gordon Fullerton.

Arriving from Houston late Wednesday, the astronauts were scheduled to practice landing a Shuttle aircraft at 7 a.m. Thursday on the Kennedy Space Center runway.

But fog on the 15,000 foot Shuttle landing strip postponed the training exercises until late afternoon, said KSC spokesman Mark Hess.

Meanwhile, a simulated countdown of the March 22 liftoff proceeded on schedule throughout Thursday.

And today, in the countdown's final two hours, the astronauts were set to awaken at 5:10 a.m., eat a hearty breakfast, don their spacesuits and take a seat in the Columbia.

The 33-hour countdown before a mock launch is designed to be as realistic as possible, with the exception of fueling the spacecraft, said NASA spokesman Rocky Raab.

Even the engines will go through a mock run during the countdown.

Following the countdown, the men who will pilot Columbia for seven days in Earth's orbit will learn the ropes of escaping in emergency baskets.

The baskets are for a quick exit from the cockpit to a bunker below in case the Shuttle experiences troubles on the launch pad. Later today, the astronauts will fly home from Patrick Air Force Base. (TODAY, 2-19-82)

February 20: The men who plan to sail around the globe in the Space Shuttle next month said Friday that even if the media lose some of their enthusiasm for more routine launches, the American people will continue to be the program's biggest supporter.

Speaking briefly after a troublesome but successful morning launch dress rehearsal, Jack Lousma and Gordon Fullerton said they tested the limits of their spacesuits and tried out the baskets that would whisk them to safety from the Shuttle cockpit in case of disaster on the pad.

A computer problem during the 10:16 a.m. dress rehearsal was fixed easily, but the mechanical failure of a steering device inside a booster rocket would have grounded the Shuttle had it been an actual launch.

A finicky computer shut down only four minutes before liftoff, delaying the start of the mock operation by 15 minutes.

"There was an element missing (in the computer program). When you tell the computer to do something it hasn't been programmed to do, it stops," said Rocky Raab, Kennedy Space Center spokesman.

The computer program is used only for simulated flights and the problem would not have prevented an actual launch. "It was not a major wrinkle," Lousma said.

But a failure in a booster rocket gyro, which sends information to the spacecraft's computers to steer the Shuttle, would have halted the real thing.

"The...failure evidently would have stopped a launch. But we went on with the countdown," Fullerton said. "We're glad it happened today, not a month from now," he added, referring to the scheduled March 22 launch date.

Raab said the one of three gyros that failed was being replaced late Friday.

"The run was successful and accomplished our objectives," launch director George Page said of the two-day mock countdown.

Although it did not delay the simulated liftoff, a heavy fog that shrouded the space center until past noon would have been enough to scrub an actual launch.

Dressed in bright blue jump suits, the astronauts told reporters gathered at launch pad 39A that they got a feel for the multibillion-dollar Columbia.

"We learned a lot from it. We saw what we can reach in our spacesuits. We recommend that every crew go through this in the future," said Shuttle pilot Fullerton.

Proclaiming themselves flight-ready, Shuttle commander Lousma said he and Fullerton were "100 percent trained" and could "fly a good mission if we were to fly tomorrow."

Lousma, who served as pilot for Skylab in 1973, said his 59 days experience in space would benefit him in the seven-day Shuttle mission.

"It helps going up there once," he said.

Aside from "a couple of doodads from my wife and family," Fullerton said he had no good luck charms for his first flight into Earth orbit.

The astronauts, both 45, arrived at the launch pad right on schedule at 7:35 a.m. Friday, after rising at 5:10 a.m. and having the traditional breakfast of steak, eggs, orange juice and coffee. Smiling and waving, they wore their brown pressurized flight suits and carried oxygen canisters.

They donned helmets, entered Columbia's crew compartment and were buckled in and connected to all systems shortly afterward.

The "close-out crew" that helped the astronauts in their preparations finished its business and simulated a closing of the crew compartment hatch at about 8:30 a.m., 1 1/2 hours from launch time.

....Following the simulation, the astronauts inspected the baskets that would carry them to a bunker in case of an accident on the pad.

Traveling the 1,200 feet from the Columbia at 60 miles an hour, the basket-on-a-wire was demonstrated about noon.

The astronauts returned to Houston late Friday afternoon, and KSC officials said Shuttle crews plan a light work schedule this weekend.

Lousma and Fullerton will return to the space center two days before launch. (TODAY, 2-20-82, pp. 1A & 8A)

February 22: Third space shuttle launch vehicle system processing continued ahead of schedule last week as the orbiter, external tank and solid rocket booster combination was moved to the launch pad February 16, five days earlier than a timetable established late last month.

STS-3 preparations were being conducted last week with six days of contingency time that could enable launch ahead of the March 22 date set by Vice President George Bush during a visit here February 5. No decision on an earlier launch date will be made until two key events are completed at the launch pad. These are the cryogenic loading test, to be conducted February 26, and the hypergolic loading, March 4-7.

George F. Page, director of shuttle operations, attributed the acceleration in processing to a combination of a normal learning curve, an absence of incidents and accidents, development of new aligning tools that facilitate the mating of shuttle vehicle elements and the elimination of schedule pressures.

Processing team members, Page said, "know their jobs better. They have a opportunity to think. The pressure is down. They feel the schedule dates are more achievable." He said the March 22 launch date "is a damn good schedule."

If this date is advanced, it will be a decision made by National Aeronautics and Space Administration headquarters in Washington. An earlier launch would impact not only the processing and launch teams here at Kennedy, but also the complete tracking and recovery networks. (AVIATION WEEK & SPACF TECHNOLOGY, 2-22-82, p. 20, Vol. 116, No. 8)

February 23: The Space Shuttle's 154-foot-long fuel tank got the once-over Monday in preparation for test loading and draining of chemicals, and engineers replaced a faulty steering mechanism on one of the booster rockets.

At 2 p.m. Friday, liquid oxygen and liquid hydrogen will be loaded into the apricot-colored fuel tank at Launch Pad 39A.

"The fuel loading is under the same conditions as launch day (March 22). This tank (for the third Shuttle mission) has never been filled before" with the supercold fuels, said Dick Young, NASA spokesman.

He said fuel tanks for the first two missions were filled with the fuels at a NASA lab in Mississippi.

Over the weekend, technicians replaced a booster rocket gyro that helps guide the Columbia after liftoff.

Engineers discovered the problem in the left booster rocket during a countdown dress rehearsal Friday.

Also being inspected was a broken switch on the instrument panel in the Orbiter's crew compartment, Young said.

The switch apparently went beyond its stop position and broke off during the simulated countdown last week but remained functional, he said.

Astronauts Jack Lousma and Gordon Fullerton plan to meet the press Friday -- the final time before the seven-day mission.

The news conference will be held in Houston and telecast to NASA centers around the country.

If everything goes well following this week's test loading of the external tank, workers will begin loading propellants into the Orbiter early next month. (TODAY, 2-23-82, p. 10A)

<> The pilot who violated air space surrounding the Space Shuttle as it readied for its first liftoff had his wings clipped for 90 days after a five-hour hearing Tuesday.

Jerry Stevenson of Cocoa had his pilot's license suspended in a compromise decision handed down by an administrative judge sent to Melbourne from Washington, D. C.

The Federal Aviation Administration disciplined Stevenson in July with a 180-day suspension for flying his Cessna along the coastline near the Shuttle pad only minutes before launch April 12.

But Stevenson appealed the suspension, contending he was given improper information by the Melbourne Flight Service about the restricted area.

The judge's decision at an appeal hearing Tuesday cut the 180-day suspension in half, but FAA officials said they still were pleased with the outcome.

The hearing in Melbourne was held by the National Transportation Safety Board, serving as an appeal agency.

The penalty could have been worse; some angry NASA officials had suggested the pilot have his license permanently revoked and charged a \$1,000 fine.

NASA and FAA officials were incensed at Stevenson's action because it threatened the timing of the Shuttle's liftoff and possibly the safety of the astronauts and onlookers.

"I don't think we have any feeling one way or another" about the lighter sentence, NASA spokesman Mark Hess said Tuesday night. "Our biggest concern is that pilots are aware of the restrictions concerning launches...This just brings it to everyone's attention."

Stevenson's license will automatically be reactivated at the end of the 90 days, although his record will permanently show the disciplinary action.

FAA officials said they had to chase Stevenson's aircraft twice before finally forcing him to land. Flight officials suggested that Stevenson was violating Shuttle space to enable his brother, a professional photographer, to shoot a photograph for NEWSWEEK.

Stevenson was unavailable for comment Tuesday. (TODAY, 2-24-82, p. 1B)

February 24: A replaced steering mechanism on the Shuttle's left booster rocket "tested out well" Tuesday, said Kennedy Space Center officials.

The mechanism, a gyro providing steering guidance after the Shuttle's liftoff, failed during a launch dress rehearsal Friday and was replaced over the weekend.

All remaining work on the Shuttle's heat protection tiles is set to be completed later this week.

Only 449 of the Columbia's light silicon tiles were replaced between the second and third flights as opposed to 1,872 replaced after the first mission.

While the tile replacement was completed before the Shuttle was rolled to the pad, there is some work that still needs to be done, said KSC spokesman Mark Hess.

That includes making sure a number of tiles are flush with one another on the skin of the spaceplane Columbia and that replaced tiles are sufficiently glued on, Hess said.
(TODAY, 2-24-82, p. 16A)

<> The Space Shuttle Columbia will lift off on March 22 and not a day earlier, top NASA officials said Wednesday.

Despite speculation the launch would be moved up by two or three days, there will be no change in the original date, announced Major General James Abrahamson, associate administrator for the Shuttle program.

"General Abrahamson said, 'make sure the media understands we are launching March 22,'" said James Kukowski, a space agency spokesman in Washington, D. C.

Kukowski said some additional time has been gained in faster-than-anticipated preparations for the Columbia's third mission, but that these two days will be "used to ease off on launch pad crews and give people some time off before the launch."

The extra time also gives the space agency elbow room to troubleshoot any difficulties on the pad. "If there are problems, we do have that cushion," Kukowski said.

Discussion of an earlier liftoff surfaced February 16 after the fully assembled Shuttle was moved from its hangar to Pad 39A. Launch director George Page said then that KSC engineers were only considering the possibility and it would "remain an open issue."

The launch is scheduled for 10 a.m. (TODAY, 2-25-82)

February 25: NASA's John F. Kennedy Space Center has awarded a construction contract to Holloway Corp., located on Route 2 in Titusville, Florida. The contract calls for modifications to be undertaken in the Space Shuttle main engine and solid rocket booster operational areas at the space center.

The fixed-price contract has a price tag of \$168,200, and is to be carried out in two separate tasks. The first part of the contract is to be completed four months after a notice to proceed is issued, and the second part three months after a notice has been issued. The contract, which was awarded on February 16, 1982, is one that has been set aside for award to a small business firm. Holloway submitted the low bid out of five proposals received by KSC. (KSC RELEASE NO. 36-82, 2-25-82)

- <> Cracking the night sky with a blue-hot plume of gas and firepower, a 116-foot-tall Delta rocket carried the pride of Western Union's fleet of communications satellites into space Thursday.

The launch at Cape Canaveral Air Force Station came at 7:04, delayed 15 minutes because of strong winds in the upper atmosphere. Boosted into the sky at 1,500 mph by nine rockets, the satellite was at the edge of the Earth's atmosphere in less than four minutes.

NASA officials called it a textbook launch of the \$28 million satellite.

Added to a fleet of three satellites, WESTAR IV is designed to relay pages of newspapers or magazines including Time Magazine, the Wall Street Journal and Sports Illustrated from widely separated printing plants.

At 22,640 miles above the globe, the satellite has an excellent vantage point to catch the coded information beamed to it from a ground-based station. WESTAR IV will relay it at the speed of light to antennae across the country. (TODAY, 2-26-82, p. 16A)

February 26: NASA's John F. Kennedy Space Center has awarded a \$3 million-plus services contract to Wiltech of Florida Corp., located at 3015 Briarwood Lane in Titusville, Fla. Wiltech is to take over the component refurbishment and chemical analysis services at the space center.

The cost-plus-award-fee contract carries a price tag of \$3,054,939 and covers the period from March 1, 1982, through February 28, 1983. The contract is one that has been awarded to a small business firm. (KSC NEWS RELEASE NO. 38-82, 2-26-82)

February 28: A critical pre-launch loading of toxic fuel in the Space Shuttle Columbia's maneuvering systems is set for this week as the reusable spacecraft nears its third mission, officials said Sunday.

Kennedy Space Center spokesman Hugh Harris said loading of the highly toxic propellant nitrogen tetroxide was scheduled for Thursday, and would take several days to complete.

Harris said space agency officials have built safeguards into the propellant-loading operation to avert a repeat of a spill during the same point in pre-launch operations last August 22.

The propellant spilled down the Columbia's aluminum skin and 338 heat-protective tiles either came unglued or had to be removed after the fluid corroded the adhesive binding them to Columbia's skin.

NASA engineers blamed a "quick disconnect" shutoff valve for the two-to-three-gallon spill down the right side of the Shuttle's nose area.

"We have changed a lot of procedures," Harris said Sunday, adding that officials have instituted "safeguards with respect to the quick disconnect."

Most launch pad workers took the day off Sunday, Harris said, and will return today to prepare for the critical operation.

A trial-run fill-up of the 154-foot high, half-million gallon external tank was carried out without problems Friday, said Shuttle operations director George Page. (TODAY, 3-1-82, p. 10A)

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March 2: Kennedy Space Center technicians laid the groundwork Tuesday for loading a highly toxic and combustible combination of propellants into the Shuttle Columbia's maneuvering engines later this week.

The operation, known as hypergolic loading, should start midnight tonight and be completed by midnight Sunday. It is the last major work at Launch Pad 39A before countdown and the March 22 liftoff.

A 30-hour checklist of tasks began late Tuesday to prepare hoses and lines that lead from widely separated ground storage tanks to five engine compartments on the spacecraft.

The pad will be cleared of all but the propellant-loading crews in special safety suits when the monomethyl hydrazine and nitrogen tetroxide begin to flow into the orbital maneuvering system and the reaction control system.

The two orbital maneuvering system engines are used to put the Columbia in orbit and get it out of orbit before re-entry into the Earth's atmosphere. The three reaction control system engine compartments are used to steer the spacecraft in orbit. (TODAY, 3-3-82, p.8A)

March 5: Despite an hour delay due to mechanical problems with a cooling system, the world's largest communications satellite was sent into space Thursday night from Cape Canaveral Air Force Station.

An Atlas Centaur rocket broke from the grip of Earth's gravity with an ear-splitting liftoff at 7:23 p.m. and in less than four minutes it was lost from view in a cloud bank.

After four minutes and 16 seconds at a healthy 8,000 mph, the two-stage rocket separated and the satellite was on the outer edges of the atmosphere.

NASA officials blamed the delay on ground-based equipment that keeps rocket systems at their proper temperatures failing at about 5 p.m.

It took about an hour to diagnose and fix the thermal conditioning system, said a space center spokesman. The thermal conditioning system uses nitrogen to keep the satellite's compartment and other delicate electronic systems on the rocket at very precise temperatures.

Although there was an ever-present haze over the launch pad, weather was not a factor in delaying the launch.

"We had a weather briefing at 4 (p.m.) and it was clear sailing from then," said Dick Young, space center spokesman.

The 16th INTELSAT will be operational by early May, 22,000 miles above the Indian Ocean.

Communications satellites are placed in a geostationary orbit -- an orbit that is synchronus with the Earth's rotation so the satellite remains over one point in space as it circles the globe.

The \$35 million satellite will have the capacity to transmit 12,000 voice circuits and two color television channels. And at 21 feet high, it is the largest commercial satellite in both size and capacity.

INTELSAT is funded by a consortium of 106 nations ranging from Monaco to Uganda. Aside from satellites, the INTELSAT system consists of 204 antennas scattered on every continent. As the need for telephone communications across borders increases, more satellite will be put into orbit. (TODAY, 3-5-82, p. 10A)

<> It took a little longer than they expected, but Kennedy Space Center technicians began the job of loading combustible propellants into the Space Shuttle Columbia at 8 a.m. Thursday.

By late afternoon, technicians at launch pad 39A were filling tanks on the left maneuvering engine compartment and the forward steering engine tanks.

It will take until Sunday to fill the five engine compartment tanks with the 1,316 gallons of nitrogen tetroxide and 1,317 gallons of monomethyl hydrazine, said Dick Young, space center spokesman.

The monomethyl hydrazine costs about \$50 a gallon, according to NASA figures. The nitrogen tetroxide, on the other hand, comes cheaper at about \$5 a gallon.

So far the operation has proceeded without a hitch. "It looks as if everything is humming along OK," said Mark Hess, space center spokesman.

Pumping the highly combustible propellants from widely spaced storage tanks was delayed for eight hours by a poorly functioning pump and a snag in setting up some fuel lines.

The seven-day mission is still set to start at 10 a.m. March 22.

An average of 15 to 20 workers are at the launch pad for the loading, taking pains to avoid repetition of an accident that delayed the second Shuttle launch by a month.

Toward the end of the carefully controlled loading operation, the auxiliary power units and hydraulic power units are filled with more than 100 gallons of hydrazine fuel.

When the job is completed, launch pad crews will begin putting computer flight programs aboard.

By Monday they will adjust the spacecraft's guidance system and stow equipment the astronauts might need in case they have to go outside the ship. (TODAY, 3-5-82, p. 10A)

March 7: It was almost as if their bodies were coated in a harsh, biting ash.

Only hours after the first Space Shuttle launch in April 1981, as many as 13 workers in the launch pad area at Kennedy Space Center mysteriously began to suffer from headaches and sore throats. Some were nauseated.

One space center guard, who asked not to be identified, remembered, "It lasted only a couple of days. My eyes were watering. I had a raspy throat. It felt like it was swelling." His temples and the top of his head also ached.

It took two teams of inspectors (the first team also became ill when it arrived in the pad area) to find the cause of the sickness at launch complex 39A.

They found that parts of the pad had been coated with a layer of white powdery material varying in thickness from a thin film to a quarter inch. A clear liquid also was found on the underside of metal handrails.

The substances, which also damaged launch pad facilities, were discovered to consist mostly of aluminum oxide -- a corrosive and irritating residue left behind in the exhaust cloud from the Space Shuttle's powerful solid-fuel rocket boosters.

Chemicals in the exhaust cloud also are known to deplete ozone in the Earth's atmosphere and pose a risk of acid rain.

Environmental health and medical personnel came to the aid of ailing pad workers along with persons associated with Project BEST, a group that has extensively studied the booster rockets' environmental impact.

Dr. Paul Buchanan was one of those who saw the ill technicians. "There were several reports of distress after the crew went out. It was like they were covered with a very astringent deodorant," he said.

"Inspectors went out and they too got the same feeling. Then we (Buchanan and others in KSC's biomedical office) went out. We made a complete sweep of the pad."

The pad workers were given immediate medical attention and no one affected was sick more than a couple of days.

"What they (physicians) noticed was a dryness of the mucous membranes. They were not pink in the nose and throat, as they should be," Buchanan said. "We told them to load up on orange juice and take saline nose drops."

The space center guard who described his launch pad illness said he was fine after his eyes were flushed and he took a couple of Tylenol capsule tablets.

"If we wanted a blood test, we could have had one," he said. "NASA told us there was no harm."

Estimates on the number of people affected vary. Pad personnel said as many as 10 became ill, KSC officials said fewer than five.

But physicians agree short-term exposure to the aluminum oxide residue is only an irritant.

NASA took notice of the risk posed by human contact with the rocket byproduct after the first launch and moved the VIP viewing site for the second launch back a mile.

Post-launch procedures changed for the second mission. Cleanup and inspection crews, the first to go to the pad following launch, were outfitted with plastic gloves and surgical masks to keep particles out of their respiratory tracts and away from their faces, Buchanan said.

The pad also was washed down within 24 to 48 hours.

The new measures were successful and there was no repeat of the problem for the second launch in November, Buchanan said.

But he warned there is no assurance the low-lying cloud of rocket exhaust particles won't travel with a stiff wind to more populated areas.

Any long-term exposure could produce some lasting nose and throat soreness and leave one vulnerable to infection from a drying of the mucous membranes, Buchanan said.

In the first launch most of the aluminum oxide particles were deposited in an area within 100 yards of the launch pad, but some were found about four miles north of the pad inside the Merritt Island National Wildlife Refuge.

According to the official NASA report on the environmental effects of the first flight, fallout particles were found along Titusville Beach Road and about a half mile west of the beach.

After the second flight, wind conditions were under 10 miles an hour and contaminants were found only in the immediate pad area, Buchanan said.

Of more concern to NASA physicians is the danger of hydrochloric acid fallout over a wide area. Hydrochloric acid is another booster rocket residue that can be carried greater distances by stiff winds.

"Damage from acid fallout could take the form of metal corrosion or even chemical burns to humans and animals. Acid particulate fallout is expected to occur on subsequent launches," Buchanan said.

While the space agency expects most wind patterns to carry the hydrochloric acid fallout seaward, Buchanan said it is "conceivable" the cloud could travel outside Kennedy Space Center, across the Indian River and into Titusville.

But that would be a serious constraint to liftoff. "I don't think we would launch in the face of such a wind," he said.

NASA was warned citrus growers in the refuge area that acid rain could fall and ruin fruit.

Buchanan cites as an example the launch of a solid-fuel rocket at Homestead Air Force Base near Miami in the mid-1970s. The exhaust cloud merged with a small rain cloud that was beginning to shower water on some nearby groves.

"That cost the government some money," he said. "We're sensitive to this problem. Grove owners here at the space center have been warned that acid rain is a possibility. But none have moved out."

NASA officials recommended in their official report following the first launch, "the Shuttle's operation on a wildlife refuge should be monitored to prevent any significant deterioration of air quality in the area."

Buchanan said while there is no indication of problems yet, constant exposure to the pollutants would be a hazard.

Aside from the harm to living things, fallout from the Shuttle's booster rockets can take its toll on property.

Reports of launch pad damage following the first mission showed the same white powder that gave workers trouble also was responsible for considerable steel corrosion.

This was evident most "where the deposit has chemically attacked and removed a portion of the galvanizing" on steel structures, according to a post-launch investigation.

"The galvanizing thickness had been reduced to the point that bare steel was exposed in spots," the report continued...

....The booster rocket residue, with its high content of hydrochloric acid, also was responsible for eating away at a steel hose.

While this hydrochloric acid could easily ruin an automobile and any other exposed metal on building or machinery, there is a low probability the exhaust cloud would drift farther than the space center area, said Bill Jones, an engineer with KSC's office of design engineering.

As for danger to automobiles in the space center during a launch, Jones said provisions have been made and will continue to protect the property of guests and employees during a launch. Plastic car covers were sold during the last launch in November.

NASA engineers said they hope to prevent any further launch pad corrosion by immediately washing the steel structure with a 3 percent solution of acetic acid (vinegar) rinsed in water and immediately coated with a protective chemical. (TODAY, 3-7-82, p. 1A & 10A)

March 9: Space Shuttle technicians Sunday completed loading the Space Shuttle Columbia with 1,678 gallons of nitrogen tetroxide and 1,688 gallons of hydrazine fuels, used to

power the Shuttle's orbital maneuvering system engines and reaction control system. NASA said the operation went well and everything is "right on schedule" for the March 22 launch of the spaceship. Pre-launch countdown preparations were slated to start late yesterday, with the storage tanks for the Shuttle's fuel cells to be loaded with liquid oxygen and hydrogen later this week. The fuel cells will be loaded next week. Final countdown for the launch will begin at 4 AM March 18. (DEFENSE DAILY, 3-9-82, Vol. 121, No. 7)

March 11: United Space Boosters Inc. moved one step closer to building a new Merritt Island plant when the Canaveral Port Authority tentatively agreed Wednesday to lease the company about 13 acres of land.

The proposed 200-acre site is on private land just north of SR 528 and the barge canal, with the port property in between. USBI executives need to lease the port land so they can build a trench connecting the barge canal with their proposed plant.

"This was one more step in the process of moving to Merritt Island," USBI attorney Harry Jones said. However, he added that the project is still in its study phase.

The company, which produces the solid-rocket boosters for the Space Shuttle, wants to build on Merritt Island to avoid having to haul the empty boosters eight miles north to the company's present facilities at the Kennedy Space Center. (TODAY, 3-11-82, p. 18C)

<> Workers preparing the Space Shuttle for its date 150 miles above the Earth are "real keyed up and ready to go," launch director George Page said Wednesday.

Preparations for a 10 a.m. liftoff March 22 are proceeding so well, Page said there is a possibility the space agency might move the date of the fourth launch up a week.

Originally set for July 7, then July 4, Page said the Defense Department's Shuttle mission could blast off as early as June 27.

"This is a preliminary one (date). We haven't locked one up yet," Page said in a news conference at Kennedy Space Center.

If the fourth launch is moved up, the fifth and possibly the sixth flights also would be advanced, Page said.

There is no change, however, in landing plans. The Columbia will put down at Edwards Air Force Base in California on the fourth flight. A landing on KSC's airstrip won't be attempted until the fifth launch, now scheduled for November 11.

The sixth flight will be the maiden voyage of the Challenger spacecraft, which Page said is due to arrive at its KSC hangar from California on June 30.

He predicted preparations for the sixth flight, set for January 20, will pose a new obstacle -- "We'll have two vehicles then." (TODAY, 3-11-82, p. 16A)

March 12: As part of an innovative cost-cutting move, NASA's John F. Kennedy Space Center has awarded Speegel Construction Inc., of Cocoa, Florida, a contract to install 64 railroad boxcars that will be used for office space at KSC. The refrigerator car bodies, which have been procured from the Topeka, Kansas, based Atchison Topeka & Santa Fe railway company, offer substantial advantages in price and durability over conventional trailers.

The fixed-price contract has a value of \$675,219, and is to be completed 140 days after the contract was awarded on February 4, 1982. The contract is one that has been set aside for award to a small business firm. Speegel submitted the low bid out of six proposals received by KSC. (KSC NEWS RELEASE NO. 49-82, 3-12-82)

March 13: A small Afghan flag will be aboard the Space Shuttle when it lifts off on its third test, the space agency said Friday.

On Wednesday, President Reagan proclaimed March 21 as Afghanistan Day and said he would dedicate Columbia's upcoming flight scheduled to lift off on March 22 to the people of that country.

The president took the action to dramatize the administration's opposition to the reported presence of 100,000 Soviet troops in the Central Asian nation. The Soviets moved into the country more than two years ago.

NASA said the flag, provided by the State Department, has been sent to Kennedy Space Center to be placed aboard the spaceship. (TODAY, 3-12-82, p. 14A)

March 15: Construction and modifications under way or in the planning stages here are aimed at supporting a space shuttle mission rate of 40 launches per year from two pads by late 1986.

Added facilities are:

- *Modification of Launch Pad 39B, budgeted at \$53.2 million and scheduled for completion in September 1986.

- *Modification and rehabilitation of a second mobile launch platform at a cost of \$13.9 million, to be ready in July.

- *Construction of a solid rocket motor processing and storage facility, costing \$12.6 million, to be completed in November 1984.

- *Installation of a second active firing room that will be used to process Defense Department shuttles as well as augment National Aeronautics and Space Administration shuttle processing capability. The firing room will cost \$3.1 million, not including computer consoles or other equipment. It is scheduled to be completed in September and be operational in December.

- *Modification of two high bays in the Vehicle Assembly Building so that assembly flow of two shuttle vehicles can be accomplished simultaneously. Some assembly stands and a

crane will be relocated to the new solid booster facility. This job, which will cost about \$500,000, is scheduled for completion in September.

About \$20 million is also being spent to equip a second bay in the orbiter processing facility to enable two orbiters to flow through processing at the same time. The second bay was built into the facility during original construction. Installation of the equipment is scheduled to be completed in July.

Launch rate capability has been aided by modifications in the vertical processing facility and life sciences building, completed in January. The vertical processing facility underwent a \$6.5-million modification. The building was used to sterilize and prepare the Viking/Mars payload. (AVIATION WEEK & SPACE TECHNOLOGY, 3-15-82, p. 68, Vol. 116, No. 11)

- <> Preparations were in such good shape Sunday for the March 22 launch of the space shuttle Columbia that the ground crew took the weekend off. Officials said it was a mark of maturity for the launch system.

The Kennedy Space Center workers were beset by one problem after another while preparing for the shuttle's maiden test flight a year ago. They were forced to work seven days a week to overcome a fuel-spill problem prior to the second flight in November.

But the date for the third test flight has remained locked in at March 22 since early January and there have been no major problems since the Columbia returned to Cape Canaveral November 25.

"It has been a real confidence builder to see how well they have been able to maintain their schedule," said astronaut Jack Lousma, the commander of the third flight for the reusable rocket plane.

The only threat to the launch date has been weather at the California landing site, and that problem appeared to be going away. More than a half-inch of rain fell last week on the normally dry lake bed shuttle landing site at Edwards Air Force Base in the Mojave Desert.

Space agency officials in Washington said if the unpaved runways were wet on launch day, the flight probably would be delayed.

But Airman George DaVall said Sunday that high winds have swept the base during the last few days and the winds act like a hairdryer and quickly remove the water from the lake bed. He said the runways were in good condition and drying rapidly. (THE MIAMI HERALD, 3-15-82, p. 5A)

- <> Only a half-dozen changes will be made in the countdown to launch the third shuttle mission as the National Aeronautics and Space Administration moves to standardize procedures to prepare the shuttle system for a high launching rate.

There were a number of significant differences in the launch countdowns for the first two shuttle missions, particularly in ordnance, range safety and fuel cell activities, along with modification of the sound suppression system to reduce overpressure at solid rocket booster ignition. (AVIATION WEEK & SPACE TECHNOLOGY, 3-15-82, p. 19, Vol. 116, No. 11)

March 17: (shut'-l fe'-ver); Condition in which Brevard County, Florida, is suddenly packed to the county line with excited visitors and local residents who buy T-shirts, camp in cars and look through binoculars until NASA launches the Space Shuttle Columbia.

Symptoms: Jammed motel rooms, long lines for NASA tours, the appearance of wire service and television network news crews, and phones that ring constantly at the Titusville Area Chamber of Commerce and the NASA public affairs office.

Duration: From now until the big bird is hurled to the heavens on a trail of fire.

Prevention: None, but if you like crowds, excitement, a lot of tourist dollars and breathtaking launches, who cares?

Treatment: None. Sit back and have a good time. (TODAY, 3-17-82)

March 19: The Solid Rocket Booster Decelerator Team at KSC has been awarded the Aerospace Awareness Panel Team Award for exceptional performance in support of STS launches 1, 2, and 3, SRB build-up, and STS-1 post flight refurbishment.

Team members from the Martin Marietta Corporation are Ken Eflin, Mark Faucher, Jesus Gonzalez-Alvarado, Robert Meyer and Craig Crowl. Members from the Pioneer Parachute Company are Tom Metz and George Hinkel.

The SRB Decelerator Team was assigned to perform packing, refurbishment and assembly of the SRB parachute systems for the Shuttle development flights, and to establish a documentation system to manage and control the refurbishment process.

The team was cited for developing a documentation system that has resulted in an extremely efficient and effective refurbishment operation.

The support that team provided Martin Marietta External Tank Operations in designing and fabricating four environmental control enclosures allowed STS-1 ET insulation repair to be accomplished at the launch pad. This extensive effort aided in considerable savings in the STS-1 launch processing timeline. (SPACEPORT NEWS, 3-19-82, p. 2, Vol. 21, No. 6)

<> Their itinerary included a warm greeting by KSC Director Richard Smith on March 3 and will feature photo sessions and a reception hosted by distinguished NASA officials and astronauts, plus an invitation to watch the Columbia lift off from a special viewing site.

Sounds like a whirlwind celebrity tour, you might say. VIP's from all corners of the country, perhaps. Guess again.

These "celebrities" are KSC employees who are being honored for outstanding contributions to the space program at KSC. Fifty KSC civil service and contractor employees have been recognized for their consistently above-average performance and dedication in achieving their particular goals that help get the Space Shuttle off to a successful start.

"You people are an outstanding example of the loyalty and skill of the people who make this program work," KSC Director Smith told the large gathering of honorees assembled in Theater No. 1 of the Visitors Information Center. "You are outstanding people and represent an outstanding team."

The group is mainly composed of non-supervisory employees who have been selected by their supervisors for the Launch Honoree Award, one of the highest recognitions presented to employees in the Space Shuttle program. The program is offered on a yearly basis throughout NASA, and this year 210 honorees from installations around the country will be given the red carpet treatment at KSC during the days before the Shuttle lifts off.

This treatment will include a reception hosted by NASA officials and astronauts two days before the Shuttle launch. Ray Corey, a member of the honoree planning panel, told the honorees they should "get involved" with the astronauts.

Among those whose work exemplifies the performance of all the honorees is Cosmo Todaro, Boeing Services International's principal engineer in the Launch Equipment Test Facility. Todaro determined that the design and installation of the Shuttle orbiter access arm controls would not function properly. In two days he modified the design, reworked the circuit patchboard and allowed testing to proceed on schedule.

Carla Harper developed computer software of vital importance to Space Shuttle processing and launching. Harper, who joined KSC just over a year ago, is an associate program analyst for Computer Sciences Corporation. The software she developed eliminated the need for an engineer to tediously translate computer data into English to verify that all planned events occur in their correct time sequence.

During STS-2 test activities at the pad, Lenford Williams, a Unified Services, Inc. custodian at Pad A, witnessed an accidental release of a chemical foam agent in the Mobile Launcher Platform. Williams' quick response allowed a clean-up that minimized a potentially long delay at the pad.

Arnolds Strauss, Sr., lead engineer for Planning Research Corporation's mechanisms and hydraulic systems, designed a lightweight payload mechanism for /putting/ the payloads into the Shuttle cargo bay at the launch pad. (SPACEPORT NEWS, 3-19-82, pp. 1 & 7, Vol. 21, No. 6)

<> To Lora Moses of the Titusville Area Chamber of Commerce it seems only neighborly that local residents would open their homes to visiting Shuttle watchers desperate for places to stay.

But to big city reporters, it's an unusual twist to the Space Shuttle story.

Moses said when word of "Operation Open Home" was transmitted nationwide by the Associated Press, she got calls from Washington, D. C., and New York City radio reporters requesting telephone interviews.

"They said they can't believe that homes are being opened to strangers down here," Moses said. "They were really impressed that people would do that."

Until Wednesday, Moses worried that there wouldn't be enough spots in private homes. Where the chamber had 103 home offers for the first launch of Columbia in April, it had only 19 by Tuesday afternoon.

Moses said she has been flooded with offers of rooms in private homes since Wednesday morning when TODAY published her appeal for help.

"The phones have been ringing constantly with people offering their homes and people needing rooms. I figure the calls will keep coming in," she said.

Moses said she's sure that by Sunday, the number of families offering room will top April's 103.

"We're getting offers from as far away as Palm Bay and some of them say there won't be any charge to their guests," she said.

Chamber officials have asked that local hosts charge no more than the going motel rate of \$25-\$40 a night.

Moses said one woman was insistent that whoever stayed with her must like dogs.

"No problem," she said. "We set her up with a veterinarian."

One couple has traveled from Kent, England, to see Monday's launch.

"They wrote a letter to the mayor asking for a room in a private home. They said they had not been able to get motel reservations. They're staying in Fort Lauderdale and will be here Sunday afternoon. We're going to find a nice home for them to stay in." (TODAY, 3-19-82, p. 1B & 3B)

March 20: Launch crews began unhooking the space shuttle from its earthly umbilical cords Friday as the countdown for a Monday liftoff continued right on schedule.

"Everything is going so smooth, it's almost scary," said NASA spokesman Karl Kristofferson.

Workers at Kennedy Space Center fell about four hours behind schedule early Friday, but made up the time later in the day. There was only one hint of trouble as the countdown clock kept ticking: problems with the mass memory units that feed information to the shuttle's five flight computers.

The two memory units have malfunctioned several times in recent months, and there is concern they might break down again during the final minutes of the countdown, when the shuttle computers perform thousands of tasks every second.

A memory unit has been "robbed" from the Columbia's sister ship, the Challenger, to use as a spare part. The Challenger, still undergoing tests in Palmdale, California, will be delivered to Kennedy Space Center in June.

"I wouldn't say we robbed it, I'd say we borrowed it," said Gene Thomas, orbiter project engineer.

One of the shuttle's five flight computers also has been acting up, but NASA officials downplayed the problem.

"There is no doubt in my mind we're going to launch Monday morning," Thomas said.

Weather conditions also are expected to be good at the Kennedy Space Center launch day.

The 72-hour countdown entered an eight-hour rest period at 6 p.m. Friday. The clock was to start ticking again at 2 a.m. this morning, when fuel cells that supply power to the orbiter during flight are loaded with liquid hydrogen and liquid oxygen. A second rest period was scheduled for 10 a.m.

The astronauts are scheduled to arrive this afternoon at Patrick Air Force Base, flying separate T-38 jets.
(SENTINEL STAR, 3-20-82, pp. A-1 & A-10)

March 21: NASA's budding confidence about the anticipated success of America's third Shuttle mission was tinged with a bit of cockiness Saturday. As Shuttle pilot Gordon Fullerton stepped from his T-38 jet, he announced: "Things are almost looking too good -- the weather, the vehicle, the state of our training."

Fullerton and Shuttle commander Jack Lousma, each at the helm of a supersonic jet, taxied onto a Patrick Air Force Base runway at noon Saturday from Houston, about two hours ahead of schedule.

And as of Saturday night, NASA engineers readying the 4.5 million-pound spaceship also had two hours to spare as they came out of a planned hold in the countdown at 6 p.m.

At 1 a.m. today the steel canopy used to service the Columbia was moved back in preparation for fuel loading before dawn Monday.

Like the men who will ride the reusable spaceship for seven days and three hours starting Monday at 10 a.m., NASA engineers were sure they would keep their date 150 miles above the globe -- on time.

"There is no reason why we can't make a punctual launch," John Talone, A Shuttle test operations engineer said.

Said Lousma, "We plan to leave town 10 o'clock Monday morning."

Posing at Patrick Air Force Base with their families for photographers, Lousma and Fullerton predicted they would have no trouble bringing the world's only reusable spaceship down on the six-mile-long Northrup strip.

"We're more trained there than anywhere else in the world...If we trained any more we wouldn't be able to stand it," Lousma said.

Said Fullerton, "We're really ready to do it, on time, on schedule, for the full duration, next week."

Shortly after their two-hour flight from Ellington Air Force Base, the astronauts took another spin in the azure Florida skies. Not just for sightseeing -- the flights are designed to get the astronauts' ears accustomed to weightlessness.

By 6 p.m. Lousma and Fullerton were having dinner at the KSC Operations and Checkout building, their home until they board the Shuttle.

They will spend today rehearsing their landings in Shuttle-like aircraft, tour the launch pad, attend numerous briefings and get to sleep at 6 p.m.

Weather conditions at both the launch and landing sites looked favorable as of Saturday night with scattered clouds and no chance of rain.

But U. S. Air Force weather watchers admitted the final word on launch conditions comes after the 24-hour forecast today. (TODAY, 3-21-82, pp. 1A & 4A)

<> If the Kennedy Space Center's new press center looks vaguely familiar to some of the thousands of journalists flocking to it, it's not surprising.

The huge white geodesic dome has been on the space center before.

In 1976, the 200-foot-wide dome stood in the shadow of the Vehicle Assembly Building, one of 15 erected to celebrate the Third Century America, the space center's Bicentennial observance.

Brought out of storage to provide a headquarters for visiting journalists, the dome was erected to provide more space to the ever-expanding press corps.

Press site manager Al Seeschaf /said/ that with 2,700 reporters, cameramen and photographers at Columbia's first launch and 2,200 for the second, the crowded and confused conditions were becoming intolerable.

"We had 11 public affairs trailers," he said. "This created quite a problem of communication."

Six trailers were occupied by NASA public affairs officers answering reporters' questions. Two others were occupied by public affairs helping reporters set up tours and interviews. Still more were set aside to handle the special needs of film, radio and television crews and provide seating space for press conferences.

Workers started construction on the dome December 23 by leveling the site and pouring a concrete foundation.

The next step involved building the framework by connecting aluminum poles at 127 joints. Next, workers added the "skin," opaque, vinyl-coated nylon, suspended from the poles by short chains.

Before the project was completed February 23, workers had added a drop-ceiling, carpeting, partitions that created about a dozen office cubicles, 10 pay phones, four television monitors and long tables that serve as desks for the first 77 journalists to ask for them.

A long, curved desk encircling half the pavilion, is manned by press representatives for KSC, the Johnson Space Center in Houston, the Marshall Space Flight Center in Huntsville, Alabama, the foreign press, National Research Council of Canada and the Department of Defense.

Seeschaf, said that although visiting reporters have been giving the large, open building rave reviews, there's a problem with the 8,825-square-foot building.

"It's still not big enough. The press's interest has continued to increase. It's gone far beyond my highest expectations," he said.

Still, Seeschaf said, there's nothing to worry about. There are always trailers. (TODAY, 3-21-82, p. 4A)

<> Although Monday morning is the third time the Space Shuttle Columbia has shot into the heavens, the event has not lost its glitter for the "stars."

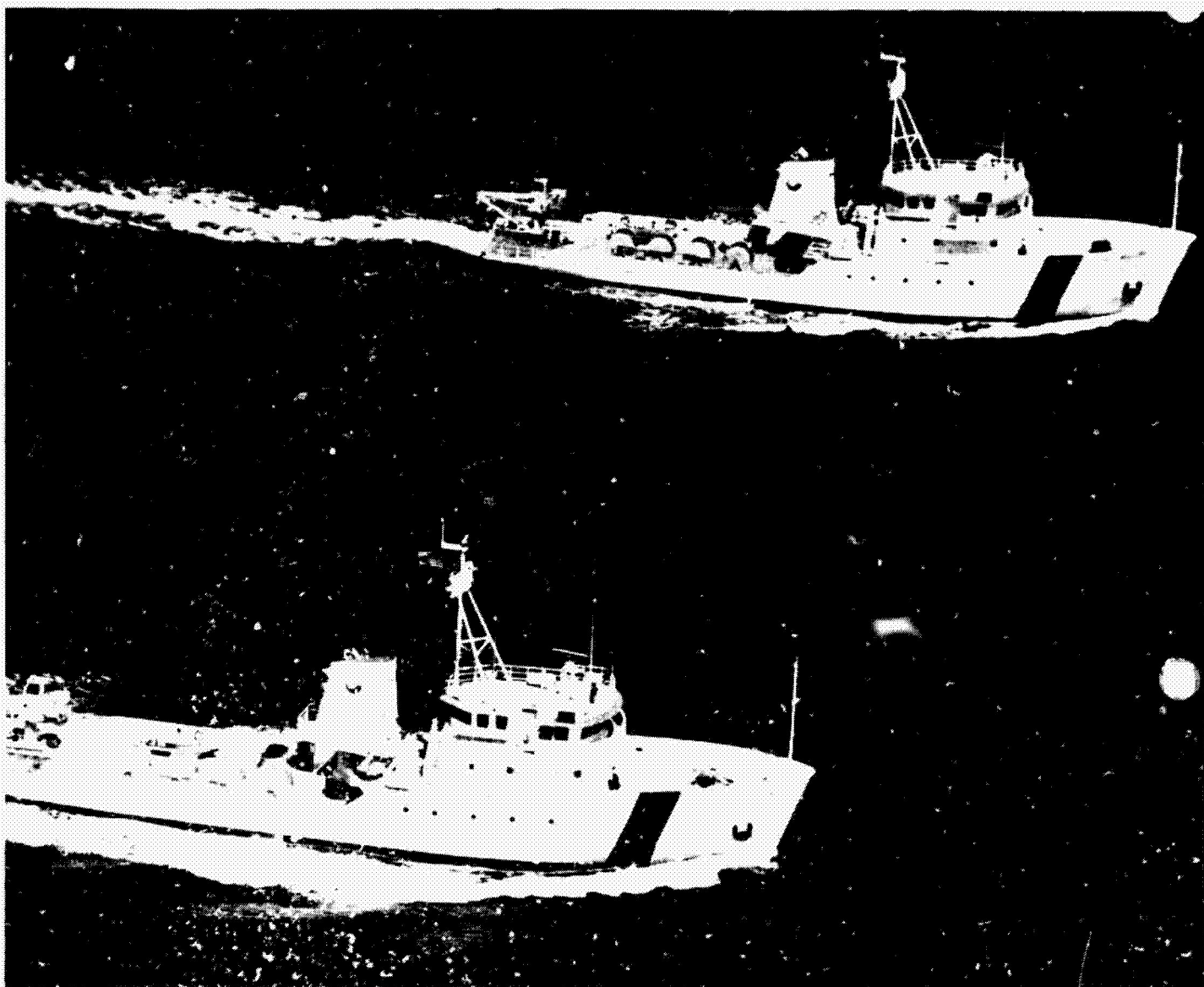
Such big-name celebrities as singers Anne Murray, Gordon Lightfoot, Jimmy Buffett and actor Michael York have accepted NASA's invitation to the launch, according to Arnold Richman, chief of visitors services for the Kennedy Space Center.

Shuttle viewers have come to expect celebrities' attendance at these historic events.

Actor Robert Redford dazzled spectators at the "scrubbed" attempt of the second flight of the Shuttle. Both Redford and singer/actor John Denver left before the Columbia was successfully launched into space last November.

According to Richman, never before has a Shuttle launch attracted so many celebrities. Approximately 3,000 VIPs attended the first and second launches, but NASA is expecting as many as 3,500 VIPs at the third launch. More than 40,000 members of the general public are also expected to witness the launch.

ORIGINAL PAGE 18
OF POOR QUALITY.



SRB Recovery Ships, UTC Freedom and UTC Liberty.

NASA is expecting numerous former astronauts to attend the launch, including Col. Ed "Buzz" Aldrin, Frank Borman, Gerald Carr, Eugene Cernan, Pete Conrad, Donn Eisele, Ronald Evans, Fred Haise, Jr., Brigadier General Jim McDivitt, Donald "Deke" Slayton, General Tom Stafford and Lieutenant Colonel Alfred Worden.

Bruce King, governor of New Mexico, where the Shuttle is scheduled to land at White Sands, also will be on hand to watch the Shuttle takeoff.

Ambassadors and representatives from 36 countries and the United Nations are expected to watch the Shuttle shoot into the sky on Monday. Also in the diplomatic assembly will be John J. Louis, Jr., U.S. Ambassador to Great Britain and former director of the Gannett Co., parent company of Today.

Twelve congressmen, including Florida's Bill Nelson and Don Fuqua will be at the launch.

NASA is expecting more than 200 educators, including Edward Boling, president of the University of Tennessee, and J.M. Petlit, president of Georgia Tech. (TODAY, 3-21-82)

March 22: Columbia shrugged off a pre-dawn fueling hitch and roared into orbit this morning on its third, busiest and longest test flight. It was the first time the shuttle had lifted off on its original launch date.

"The first part of the flight was a real barnburner," commander Jack Lousma told Mission Control. He spoke as the Columbia was soaring 150 miles above the Earth with Lousma and pilot Gordon Fullerton in control.

A problem with one of the ship's auxiliary power units was reported by ground monitors. But the astronauts were told to make a precautionary shutdown, and Columbia was sent further into space. The ship can fly and return with just one of the hydraulic units working.

"The shutdown should have no impact," said John McLeaish, Mission Control spokesman.

The shuttle's third flight began in a burst of flame and smoke as the ship's three main engines and two solid fuel rockets flashed to life on Complex 39A at the Kennedy Space Center. The space ship, which weighed 2,239 tons at liftoff, rode a pillar of yellow flame into the partly cloudy sky. It left a long trail of smoke.

Eight minutes, 34 seconds later the main engines had shut down and the astronauts were in orbit, streaking along at 17,400 miles an hour.

The ascent was cheered by about 1 million people who had jammed viewing spots for the liftoff. Many camped for days to claim choice sites along the Indian and Banana rivers and the Atlantic Beach.

Fifteen seconds after ignition Columbia was obscured by low clouds. But when it emerged 15 seconds later into a bright blue sky, the crowd at the Kennedy Space Center thundered applause.

One minute into the flight, Lousma said, "We're looking very good."

Liftoff had been delayed an hour because a heater had refused to start automatically and a technician had had to do the job.

No matter that launch was a little late. It came on March 22, the date the National Aeronautics and Space Administration had set three months ago and had very much wanted to meet. NASA was determined to demonstrate to the shuttle's paying customers that the craft could meet a timetable.

But today, after about 50 seconds into its flight, the spaceship pierced through the most dangerous point in the ascent -- an area known as Max Q, where it was subjected to its maximum aerodynamic pressures.

At 2 minutes, 6 seconds, Columbia shed its two 149-foot boosters, hurling them toward a planned parachute landing in the Atlantic. Ships waited there to recover them for reuse.

The shuttle continued diving upward under the power of its main engines, accelerating ever faster as they plunged into a thinner upper air. (ST. LOUIS POST-DISPATCH, 3-22-82)

- <> National Aeronautics and Space Administration has dropped astronaut backup crews from its space missions and has begun naming prime crew astronauts several missions in advance of flights. Backup crews have been dropped because of the growing number of astronauts who have either flown the shuttle or are highly trained and could take over a mission assignment quickly if a prime crew could not fulfill its duties.

The naming of prime crews several missions in advance has been adopted because shuttle missions are becoming more closely spaced. The new policy had been sought by the astronaut office for prime crews who have been training for specific missions but were prohibited by NASA from acknowledging their flight assignments. (AVIATION WEEK & SPACE TECHNOLOGY, 3-22-82, p. 55, Vol. 116, No. 12)

- <> (The following are excerpts of NASA Administrator James Beggs' remarks last week to the Twentieth Goddard Memorial Symposium where he recommended a manned Space Station as the next U.S. project in space and invited other nations of the Free World to participate in the project).

"....Now that we have the Space Shuttle, what should we do over the next decade and beyond to expand the opportunities its capabilities offer?

"There are two ways we could go.

"The first is to modify the Orbiter itself to extend its orbital flight time, launch capability and range. But the Shuttle was never conceived as an end in itself; rather it was conceived as means toward an end. Many tend to forget that the Columbia and her sister ships originally were conceived to shuttle payloads routinely to a space station. And that brings me to the second alternative, which is more preferable and more logical: establishment of a permanent human presence in low earth orbit -- a manned space station -- using the Orbiter to test, supply and service it...." (DEFENSE DAILY, 3-22-82, p. 124, Vol. 121, No. 16)

<> In his book, "The Right Stuff," author Tom Wolfe wrote, "Cocoa Beach was so Low Rent that nothing on this earth could ever change it...."

Well, nothing except a few 1970s-vintage condominiums that would pretty much crowd every camera angle in the film version of "The Right Stuff".

OK, first the bad news.

We're not going to be movie stars.

Now, the good news.

"The Right Stuff," the story of the Earth antics and the outer-space heroics of the United States' first seven astronauts, is going to be made into a movie anyway.

Putting that all together: "The Right Stuff" movie is going to be made, but it's not going to be made here, as originally planned.

It's not that Cocoa Beach, which served a playground and temple to our first seven space travelers, doesn't have the right stuff any more, says the film's publicist.

It's just that Cocoa Beach doesn't have the same stuff.

"Houston and Cape Canaveral just no longer look like what they looked like 20 years ago," Tom Gray said in a telephone interview from San Francisco, the film's base of operations.

Instead, the movie makers' sights shifted to the vistas of the Pismo Beach, California, area, where, Gray said, they found -- intact -- that "tacky" boomtown-look Tom Wolfe so thoroughly described in the book which has led to the movie. (TODAY, 3-22-82)

<> The Reagan administration is deeply committed to the future of the space program, convinced that to do otherwise would be penny-wise and pound-foolish, presidential counselor Edwin Meese said today.

"The fact that we have economic problems cannot keep us from going ahead with what is really the program of the future," Meese said on NBC's "Today" show. "There's so much to be gained from the space program that we can't afford as a nation not to support it fully."

He said that cuts in the space agency's budget last year were minor and that they were needed "to stay within our spending limits. But actually, the budget for 1983 will be an increase of about half a billion dollars."

He said one of the primary benefits of the shuttle program was that its success was likely to spur investment in the space program by other countries and private industry.

In addition, the shuttle offers the potential for advances in computer technology, communications, materials processing, medicine and transportation, Meese said. (ST. LOUIS POST-DISPATCH, 3-22-82)

<> A Miami television crew trying to find the press site at Kennedy Space Center Sunday night got a close look at the Space Shuttle -- a lot closer than security patrols wanted.

The WPLG-TV crew, wandering through the sprawling facility in a large camper, had traveled within several hundred yards of pad 39A when a man dressed in battle fatigues and armed with an M-16 rifle appeared.

"You must be lost," the guard said. After warning the news people about tight security, he pointed them back toward the press center -- three miles from the launch pad. (TODAY, 3-22-82)

<> Canadian Ambassador Kenneth Taylor, who made international news two years ago for his role in spiriting six American hostages out of Iran, was more than happy to stand by Monday and watch the world's spotlight fall again on the Shuttle Columbia.

One of many foreign diplomats at Kennedy Space Center to view the Shuttle's climb into the clouds, Taylor said NASA's program generates "a tremendous amount of enthusiasm (in Canada)."

Taylor is no stranger to spoken words of praise. President Reagan honored him with a Congressional Gold Medal for his help in hiding six Americans who fled the U.S. Embassy in Tehran when it fell November 24, 1979. The embassy workers were secretly whisked out of Iran January 29, 1980.

After watching the Shuttle's billowing ascent into the clouds Monday, the 46-year-old Taylor exclaimed, "Wasn't that exciting? Just tremendous."

Now a Canadian diplomat in New York City, Taylor said the third launch of the Columbia is being watched even closer by Canadians. Why? Because this Shuttle trip is the first time a Canadian-made mechanical arm inside the Shuttle will be asked to handle a payload.

The robot-like arm, NASA hopes, will lift an 800-pound environment contamination monitor and suspend it in space for two hours. The equipment was designed to test contamination measurements. (TODAY, 3-22-82)

<> While waiting for Columbia's liftoff Monday morning, actor Jimmy Doohan proved that his surrort of space exploration goes beyond his role as Scotty in the "Star Trek" television series and movies.

Working with a film crew, Doohan took advantage of his surroundings at the Kennedy Space Center press site by filming a sequence in an upcoming documentary he is narrating, "Americans in Space, The Shuttle Era."

The film, being produced by an independent California firm, will be offered for sale to a television network or for distribution by a movie studio.

An admitted space fanatic, Doohan also attended Columbia's second launch in November. (TODAY, 3-22-82)

March 23: While Shuttle astronauts Gordon Fullerton and Jack Lousma suited up for Monday's launch, Bob McCall and Alan Cober watched their every move.

Ushered into the "white room" around 6:45 a.m., the pair came not to prepare the astronauts for flight or offer technical assistance. Instead, for a precious five minutes or so, they took down impressions they eventually will commit to canvas.

McCall and Cober are part of an eight-member team of artists commissioned by NASA to produce artwork on the various phases and people connected with Shuttle 3. They're on the latest part of a nearly 20-year-old NASA project to build a permanent record of the space program. (TODAY, 3-23-82, p. 2B)

<> It is fast becoming a part of Americana, the space shuttle strapped to the flame-tailed silo with the bullet head -- a source of pride, a subject of cheering.

But for Fred Haise, it is a symbol of what might have been.

Timing and age kept him from again taking the astronaut's ultimate, Monday's roaring roller coaster. Delays and downturns in the shuttle program, and damage and dullness that the years bring to eyes and reflexes made Haise a spectator instead of a prime player in Monday's launch.

While waiting for the launch, he passed his retirement off with a practiced shrug.

"It was a matter of looking ahead. I left the astronaut program, but I'm still in the space program planning projects. You cannot fly forever. Too many people try to go too long," Haise said.

"I'm wearing glasses now."

At 48, his trim build offsets the iron gray of his brush-cut hair and he still looks like he could climb into Columbia's cockpit.

But in July 1979, he stepped away from the discipline he followed for 13 years. He stepped away from a sure chance to fly the shuttle into space.

Six of those years were spent on the space shuttle project. Haise made the desert dry runs in Columbia's sister ship, the Enterprise, proving NASA's big bird could fly.

Dry runs don't match the rocket's rush. Nor do they bring fame. If the shuttle hadn't suffered maddening delays, Haise would have been commander for one of the first four launches and could have had both.

Haise retired.

"It's like sports. Eventually you reach a point where you age. And physically, other men can handle the job better," he said.

"I sort of felt like I had my chance."

But even Haise's earlier chance at glory, an Apollo moonshot in 1970, took a frustrating and nearly fatal turn. Apollo 13 was aborted by an explosion that left the craft's main engines silent. Haise and his two fellow crewmen made jury-rigged repairs to nurse their crippled craft home.

"It's like you got all the way through your Ph.D. and flunked your oral exam. At the time, it was very disappointing. You train and train and train for something and then fall short. Life is full of some of those things."
(SENTINEL STAR, 3-23-82)

<> The Space Shuttle Columbia, piloted by astronauts Jack Lousma and Gordon Fullerton, blasted off from Kennedy Space Center at 10:59 AM EST yesterday with a quarter million spectators in attendance and went into its circular 150-mile orbit at 11:41 AM with a 132-second burn of its dual maneuvering engines. NASA officials late yesterday afternoon said they are continuing to aim for a full seven-day mission. Launch was delayed for an hour when the nitrogen heater on the Mobile Launch Platform failed to operate. A problem was also encountered when one of the three Auxiliary Power Units that power the Orbiter's hydraulic flight control systems overheated on the ascent into orbit and had to be shut down. Mission control reported later that the APU had cooled down and that it was not expected to affect the duration of the mission.
(DEFENSE DAILY, 3-23-82, p. 132, Vol. 121, No. 17)

March 24: While the world's attention shifted Tuesday to Houston's Johnson Space Center to follow the Shuttle 3 mission, workers at Kennedy Space Center focused their attention on bits and pieces of heat tiles that fell from the spacecraft at liftoff and waited for the return of the Shuttle's huge twin solid rocket boosters.

A debris crew found pieces that may belong to 12 heat tiles Mission Control believes fell off the Shuttle's base heat shield during liftoff.

The tile remnants were scattered around Pad 39A and as far as three miles away on Playalinda Beach.

The crew made its search for tiles after astronauts Gordon Fullerton and Jack Lousma reported a "fairly big chunk of white stuff" knocked against their cockpit window during Monday's liftoff.

The latest NASA count shows 37 tiles to be either missing or damaged from Columbia -- 12 torn from the base heat shield area and 25 missing or damaged around the craft's nose.

The crew started looking for the tiles around 7 a.m., said Karl Kristofferson, a NASA public information officer.

They also examined engineering films of Monday's liftoff and saw tiles falling off the Shuttle.

Technicians then conducted their search along the Shuttle's takeoff path. Although crew found "one pretty large piece of tile, most of them (18) were 1 to 2 inches long, Kristofferson said.

Technicians had given the launch pad area a cursory inspection two to three hours after Shuttle 3 blasted off Monday, Kristofferson said.

Among the things they looked for were tiles on the pad, in the flame trench and around the mobile launcher -- the three spots where tiles from prior launches have been discovered. Apparently none was found during that Monday inspection, he said.

The tiles, perhaps the most maligned part of the Space Shuttle program, for the Shuttle's thermal blanket -- 30,000 silica panels that keep Columbia from sizzling dangerously during re-entry.

On its maiden mission last April, Columbia lost one tile and 17 others were damaged.

Difficulties in gluing the tiles on delayed the start of that mission. They would not bond to the Shuttle's skin until they were redesigned and injected with a bonding material.

Shuttle 1 landed without difficulty. The tiles did even better on last November's second flight.

Meanwhile, NASA got some good news Tuesday night when the Shuttle's solid rocket boosters were towed into Port Canaveral in better condition than models used in two prior Columbia flights.

NASA solid rocket booster vehicle manager Roy Ramsey said the 149-foot boosters suffered less damage on this mission because the booster covering was modified.

The rockets, which powered Columbia's third liftoff Monday, were jettisoned after 126 seconds and splashed down on target, about 170 miles from Kennedy Space Center in the Atlantic Ocean.

Just as planned, they had poured out as much thrust as 400,000 subcompact cars starting in unison, all in three one-hundredths of a second.

Then, 126 seconds into flight, small explosive charges shoved the huge cylinders away from Columbia leaving them to drop into the ocean.

The only failure was in the flotation device used for one of the SRB's parachutes. A main parachute, which costs about \$60,000, sank, Ramsey said. Each SRB is equipped with three main parachutes and two smaller ones.

SRB recovery ship UTC Liberty arrived in port at about 6:15 p.m., with the Freedom right behind it, said Sue Butler, spokesman for United Space Boosters, in charge of recovering the rocket boosters.

The solid rocket boosters will be cleaned and disassembled at the space center, then returned to their manufacturer, Thiokol Corp., in Brigham City, Utah, to be prepared for use on a later mission.

Refurbishing a pair of booster rockets costs \$12 million, a bargain compared with the \$25 million price tag on a new pair, according to NASA.

Once in port, recovery crews began the 2 1/2 hour job of pumping out the remaining 160,000 gallons of water from the tanks. That done, one SRB began the four-hour ride to its dock at Cape Canaveral Air Force Station. The second tank is scheduled to be moved there today.

Launch pad 39A also got away with little damage, said NASA spokesman Mark Hess. "It was less than (Shuttle launches) one or two, and they (pad workers) didn't think those were too bad," he said.

"Usually they find speakers and lights lying around on the ground. This time they didn't," Hess said.

That the pad got by with nothing more serious than large scorch marks in the flame trenches was attributed to a pre-launch clean-up more thorough than any in the past and the addition of water jets designed to lessen the shock wave that bounces off the ground back toward the departing Shuttle. (TODAY, 3-24-82, p. 8A)

March 25: With the third successful launch of the space shuttle, Columbia, the National Aeronautics and Space Administration has taken another step toward the goal of making such flights routine. This latest in a series of shakedown cruises is testing the spaceworthiness of the craft and performing several scientific experiments.

The shuttle has been the target of sharp criticism by influential members of Congress, who question both its cost and its value in this period of fiscal belt-tightening. But with each successive flight, NASA's unique reusable space plane demonstrates its flexibility and its potential as our extraterrestrial workhorse. It can carry a laboratory loaded with sophisticated scientific instruments far beyond the Earth's atmosphere; it can put satellites into orbit with unexcelled accuracy; it can help erect a defense shield more than 100 miles above us. The shuttle, in short, is our best bet for maintaining our edge in the space race. (THE HOUSTON POST, 3-25-82, p. 2B)

- <> Technicians examined launch pad 39A Wednesday /March 24/ and studied films of liftoff to determine whether ice built up on the space shuttle's fuel tank and then chipped off to destroy 37 heat-protection tiles.

The shuttle's nose warmer -- also known as the beanie cap or coolie cap -- is designed to keep the tip of the fuel tank warm even with supercold (minus 295 degrees Fahrenheit) liquid oxygen and hydrogen inside.

But it's believed that ice still forms on top of the sub zero tank in the last few minutes before liftoff.

The nose cap is designed by Planning Research Corporation of Washington, D. C. The firm, prime engineering contractor for ground support equipment at Kennedy Space Center, modified the cap after both of last year's shuttle launches.

"There's been so much work done on it," said spokeswoman Janet Bonder. "What they're trying to do is keep ice from forming and chipping the tiles." (THE HOUSTON POST, 3-25-82)

- <> Workers at Kennedy Space Center continued Wednesday to assess the side effects of the Space Shuttle Columbia's fiery liftoff, with some measuring environmental effects while others searched for pieces of tiles knocked from the Orbiter during launch.

ORIGINAL PAGE IS
OF POOR QUALITY.



DC-8 personnel departing from KSC to White Sands, N.M.

KSC's environmental health officer, Dr. Al Koller, said preliminary checks indicate the toxic exhaust cloud that billowed from beneath the departing Columbia did no permanent damage to plants or wildlife.

And Columbia's roar appeared to represent nothing more than a temporary nuisance to the animals living near launch pad 39A, he said.

"There was nothing new or startling about (the environmental effects of) STS-3. It looks about the same as STS-1. We're beginning to get a pattern we can depend on," he said.

Seashore Superintendent Don Guiton said the beach was closed until 12:30 p.m. so that pad workers could search for pieces of brittle heat protection tiles lost or damaged during Columbia's liftoff.

Searchers scoured five miles of beach from the space center boundary to the Brevard-Volusia county line. Launch pad 39A is about two miles south of the beach. (TODAY, 3-25-82, p. 1A)

March 29: Liftoff of Columbia piloted by astronauts Marine Col. Jack R. Lousma and USAF Col. C. Gordon Fullerton at 11 a.m. EST March 22 took the crew and Johnson Space Center controllers through a more advanced ascent profile than that flown by the first two shuttle launches.

New abort options, dynamic pressure g-load modulation and changes in main engine throttling combined to make the ascent more complex than Mission 1 and 2. The auxiliary power unit (APU) system created ascent problems for the second resulting in a precautionary shutdown of one of the three units near the end of powered flight.

Immediately upon liftoff from Pad 39A here the vehicle's twin Thiokol/McDonnell Douglas solid rocket boosters began to maintain engine nozzle positions based on "assessment aerodynamics" of the vehicle on earlier flights.

This was different from Mission 1 and 2, which used predicted rather than observed vehicle characteristics loaded into the command loops of the orbiter's general

purpose computers (GPCs). This change was expected to be noticeable to Lousma and Fullerton, who were told during their pre-mission planning to observe their attitude direction indicators to insure that pitch error needles remained within 1-1.5 degrees of the center reference datum.

During the first two flights the crews observed up to -5 degrees error needle deflections as Columbia flew with somewhat different characteristics from those predicted.

Columbia completed its 180-degree roll as it passed through about a 5,500-foot scattered cloud deck. Mission commander Lousma called, "Oh, what blue skies," as the vehicle left the overcast behind.

At 30 seconds Columbia began to fly a flight path angle that minimized vehicle g-loads. This steering profile was maintained until 1 minute 18 seconds at about 60,000 feet and Mach 3.

Another change from previous flights occurred at 32 seconds, when Columbia's three Rocketdyne main engines were throttled from 100% to 68% about 12 seconds earlier than during the first and second missions. This was to relieve maximum aerodynamic pressure on the vehicle in the Mach 0.6 to Mach 1 regime, where additional structural load margins were desired.

Lousma radioed an equivalent airspeed of 460 kt at 1 minute 25 seconds into the flight compared with the 466 kt. predicted airspeed at the point in the profile where dynamic pressure peaks.

Maximum dynamic pressure for Mission 3 at this point was 650 psf. compared with 640 psf. obtained on the second flight.

The way the dynamic pressure limits were handled in flight for this mission also varied significantly from the first two missions. During Lousma and Fullerton's ascent their vehicle dynamic pressure limit was varied as a function of Mach number at given altitudes, not as a function of maximum allowable dynamic pressure at a single point.

Columbia was commanded through a much steeper trajectory throughout its entire ascent compared with the first two missions, and its main engine cutoff targets were at a lower altitude. These changes were caused by a combination of factors, including Columbia's heavier flight mass, a revised abort philosophy and the vehicle's inherent performance.

Lousma and Fullerton flew for the first time what is considered the nominal launch trajectory for the shuttle program -- a trajectory that follows a continually ascending line into orbit. On the first two launch trajectories the shuttle climbed initially, dove earthward for several miles and then climbed again to achieve desired cutoff targets.

Those trajectories were lofted early in the profile to allow the excess performance available to be used to assist the return to launch site abort trajectory option. Mission 3 did not have excess performance to spare on a lofted trajectory because the orbiter had a heavier liftoff weight. (AVIATION WEEK & SPACE TECHNOLOGY, 3-29-82, pp. 14-15, Vol. 116, No. 13)

- <> Martin Marietta's external tank that carried liquid hydrogen and liquid oxygen for the third space shuttle mission landed as planned in the Indian Ocean, but flight analysts will not know if the tank tumbled until motion picture film is removed from the orbiter Columbia.

First look data indicate the impact point was 98.7 degrees East Longitude, 32.7 South Latitude. Tumbling provides better control for landing.

The Mission 3 tank weighed 75,770 pounds, 1,421 pounds less than the tank flown in Mission 2. During the countdown, time to drain back liquid oxygen was extended by 33 seconds, reducing the weight of residuals after main engine cutoff by about 550 pounds. It was determined after the first two flights that the tank contained too much residual oxidizer after it was no longer being pumped into the engines. (AVIATION WEEK & SPACE TECHNOLOGY, 3-29-82, p. 17, Vol. 116, No. 13)

- <> Launch of the third space shuttle flight at 11 a.m. March 22 was preceded by the smoothest, most incident-free countdown conducted so far in the shuttle program. Only five

countdown anomalies occurred, and the one that caused an hour delay in planned liftoff was attributed more to procedures than to equipment malfunction.

The delay from a scheduled 10 a.m. launch was caused by a thermocouple in the mobile launch platform gaseous nitrogen system used to purge liquid hydrogen tanks. The sensor recorded erroneous high temperatures and eventually was bypassed. The incident caused a scheduled hold of 1 hour 40 minutes at the T-2 hours 5 minutes point to be extended by 60 minutes. George F. Page, director of shuttle operations, said in the future the launch crew will react faster to problems such as this.

NASA believes that with the experience of preparing three shuttle vehicles for launch, the fourth mission can be launched 78 calendar days, or 64 working days, after Columbia returns here from its landing on the Northrup Strip at White Sands, N.M. This compares with 750 calendar and 668 working days for the first launch; 198 calendar and 178 working days for the second, and 114 calendar and 97 working days for the third. (AVIATION WEEK & SPACE TECHNOLOGY, p. 17, Vol. 116, No. 13)

- <> The successful operation of the Space Shuttle Columbia's Remote Manipulator System -- a long, strong robot arm -- has evoked a great feeling of pride among Canadians.

The 50-foot arm is Canada's contribution to the Space Shuttle program. And it is a vital contribution, because many of the planned uses of the space workhorse can only be carried out through use of this unique lifting and positioning mechanism.

The arm was built by Spar Aerospace Ltd. of Toronto, Ontario. Unofficially, there is talk that Spar Aerospace is one of several companies considering opening plants in the Titusville area for involvement in the Shuttle's on-going commercial operations that will be starting after the current series of checkout flights is completed.

The arm got its first real test Thursday when it grasped and lifted a scientific experiment package off a pallet in the Columbia's cargo bay. The arm also proved to be quite adept in putting the load back into its storage place, a maneuver called "rebirthing" in NASA parlance.

We congratulate the Canadians for the fine work they have done in connection with this key element of the Shuttle's development. (TODAY Editorial, 3-29-82, p. 62.)

March 31: At three minutes before 10 a.m. today, Lynn Barnett and his 40-member landing site team received the bad news: the space shuttle Columbia would touch down as planned in New Mexico.

It was not coming home after all.

The immediate reaction, Barnett said later, was "unprintable."

"We were very disappointed," he added.

Barnett, landing site convoy commander, and his team began arriving at the Kennedy Space Center at 2 a.m. "At the time we came in we thought we'd be the prime site," said Barnett, an 18-year NASA veteran.

"They held us off until the deorbital burn a little after 10," he said. "It was just enough notice to go watch it someplace /on television/."

By noon, most of Barnett's team had gone home and the convoy commander stood alone with reporters next to the three-mile runway that is planned as the shuttle's permanent landing strip after two more missions.

The team, which is identical to the landing site team at White Sands, N.M. consists of firemen, crash crew and technicians to cool and air-condition the spacecraft and vent any poisonous fumes that may have accumulated.

When Mission Control announced Monday that the Kennedy Space Center could be the backup landing site because of gale-force winds and blowing sand in New Mexico, "all hell broke loose here," in the words of a space center canteen worker.

The public affairs staff, dressed in Smithsonian mail-order Space Shuttle ties, ordered 50 special buses to transport an estimated 700-member press crew to any of nine outdoor viewing sites. The Brevard County sheriff's department put 100 men on a 30-minute alert for crowd control. Motel room reservations went fast as tourists held on another day.

"We were here at 3:15 this morning, ready to go," said Machel Jackson, who staffed a food wagon.

During this mission, the third for the shuttle, NASA officials had hoped to avoid landing at the Kennedy Space Center before perfecting a pinpoint touchdown in desert crosswinds typical of the stiff breezes that whip inland from the Atlantic Ocean.

Barnett and his crew were prepared for any emergency. "We've been on a ready mode since launch," he said. Daily standby alerts and two "dry runs" since the Columbia was launched eight days ago "built up our confidence we could do it," he said. (THE WASHINGTON POST, 3-31-82, p. A-6)

APRIL 1982

April 1: With the space shuttle rapidly maturing, NASA is going to press for its long-sought goal of a multi-person orbiting station.

"We're working hard at pulling the plan together and will present it to the administration later this year," NASA Administrator James M. Beggs said in a recent interview. He said it would establish a permanent U.S. civil and defense manned presence in space, using the shuttle as a ferry vehicle. (ATLANTA CONSTITUTION, 4-1-82)

April 5: As the Kennedy Space Center's Life Sciences Support facility expands to prepare more non-humans for space flights, one rule remains unchanged -- animal admittance is by invitation only.

Certain monkeys, gerbils and hamsters are welcome. So are rats, mice, turtles and frogs with the proper breeding.

Those without acceptable lineage can stay home.

The invited guests are destined for space aboard Spacelabs 3 and 4 in 1984 and 1985.

Dr. Carter Alexander, who retired Friday as the director of the space center's biomedical unit, said he and those who worked with him have gone to as much trouble to see that the animals don't catch diseases as they have for the humans.

"No party crashers," Alexander says of the animals living in the wild around the old Canaveral Air Force Station hangar that has been transformed into an animal lab.

"We really worry about rats, vermin and roaches getting into our pristine animal quarters," he said.

Currently, construction of offices, conference rooms and plant labs continues in two-story lean-tos at the hangar, and some animals could begin moving in at the end of the month.

The 60,000-square-foot lab will include seven animal holding rooms. They are separated by animal breed and the degree of cleanliness required.

While facility Manager Jerry Moyer and his crew will work to keep every cage and its inhabitants clean, one area will go several steps beyond the common perception of clean.

Like the astronauts, animals destined for space will spend the two weeks before flight in a super-clean room in which the air is carefully filtered and recirculated 12 times an hour and access is limited to a few healthy, relatively germ-free humans.

Because part of each animal's system bears a close resemblance to some function of the human body, scientists will use them to see what precautions they should take to help astronauts deal with the effects of prolonged weightlessness.

To defend against animal escapees who might damage valuable equipment or hurt technicians or astronauts, their handlers are equipped with tranquilizer guns and nets. (TODAY, 4-5-82, p. 1B)

- <> Workmen were prepared to service the orbiter Columbia if adverse weather in White Sands, N.M., forced a landing here, and engineers and technicians were hopeful that the Kennedy turnaround operation could be tested at the completion of the third shuttle flight.

Landing on the 15,000-foot concrete runway at Kennedy will be part of the flight plan on Mission 5 or later, depending on when confidence is reached in the auto-land and crosswind capabilities of the orbiter.

As a contingency landing site, this facility possesses a full set of access equipment and umbilicals in order to safely and purge orbiter systems. The runways are 33 and 15.

At the time the orbiter landed at Northrup Strip in White Sands, Kennedy had scattered clouds and 12-kt. winds from the east, gusting to 20 kt. The temperature was 74F and visibility 7 miles. Mission 1 pilot, Robert L. Crippen,

flew shuttle approaches and landings for about an hour in the Grumman Gulfstream shuttle training aircraft. (AVIATION WEEK & SPACE TECHNOLOGY, 4-5-82, p. 18, Vol. 116, No. 14)

- <> The two solid rocket boosters used in the third shuttle launch were towed to a dock here March 23, and detailed inspection indicated they were in better condition than those retrieved after the first two missions.

The boosters were jettisoned 126 seconds after ignition and hit the ocean 184 miles due east of Matanzas Inlet on Florida's east coast.

Divers from the recovery vessels Freedom and Liberty secured lines to the spent boosters in calm seas.

Although the impact caused some structural damage inside both aft skirts, United Space Boosters had added 50 gussets to the structure and plans to further strengthen aft skirts on future boosters with a total of 273 gussets. The fourth flight set will have this modification.

One of two explosive nuts used to activate a parachute in the right booster did not function, and the parachute did not unreel completely. As a result, this booster came down faster than the other. The parachute was lost at sea. The other five main parachutes were recovered. (AVIATION WEEK & SPACE TECHNOLOGY, 4-5-82, p. 47, Vol. 116, No. 14)

- <> Improved weather prediction and decision processes are needed at the Kennedy Space Center to make the most efficient launch and landing judgments for operational shuttle missions, according to USAF Major General James A. Abrahamson, NASA associate administrator for space transportation systems.

The decision process used during the first countdown for the second shuttle mission, when weather was a significant factor, brought out the need for improved procedures and capabilities, some of which were used for the third shuttle mission.

These included designating Astronaut USAF Colonel Karol J. Bobko as the primary focal point for weather data reported by Astronaut Navy Captain John W. Young, who was airborne in a Gulfstream American 2 shuttle training aircraft.

Bobko then passed return-to-launch-site abort runway visibility data to managers in the launch control center.

This procedure was used when scattered heavy clouds moved over the launch site shortly before liftoff.

Young first flew a shuttle-type approach to Runway 15 at Kennedy and said he could not see the aimpoint for the runway but could see the runway itself.

Young's first approach was flown 30 minutes prior to liftoff. Ten minutes prior to liftoff he flew another approach but to Runway 33 and immediately recommended it be used instead of Runway 15.

Young said he could see the aimpoint, precision approach path indicator lights and the Vehicle Assembly Building as references.

Bobko, stationed at the runway, concurred and passed the information to the launch control center.

This procedure resulted in the crew changing their return-to-launch-site abort targets to Runway 33 instead of Runway 15. (AVIATION WEEK & SPACE TECHNOLOGY, 4-5-82, p. 19, Vol. 116, No. 14)

April 7: After a smooth flight home from New Mexico, the space shuttle will be rolled back into its hangar today to prepare for a June 27 launch.

Riding piggyback atop a Boeing 747 jumbo jet, the Columbia touched down at 3:58 p.m. on a three-mile concrete runway at Kennedy Space Center.

More than 8,000 visitors, space workers and their families turned out to witness the homecoming, yelling and applauding as the shuttle appeared from the south. Another 100,000

spectators crowded the landing strip at Barksdale Air Force Base, near Bossier City, Louisiana, where the tandem aircraft stopped to refuel during the 1,543-mile overland journey.

"Look at that sucker! There it is!" whooped Jack Oates, mayor of Rockledge, as the two planes came into view.

Although it was the fourth time the shuttle has arrived here, enthusiasm was undimmed. Some parents lifted their children atop searchlights and generators for a better view.

"We'll probably see a lot more of this than we did of the royal wedding," Pat Nicholson, a visitor from Essex, England, said as the shuttle drew near.

"It gives me tears and goose bumps -- the whole works," said Kathryn Hining, 54, of Orlando, as she grasped the same tiny American flag she waved 15 years ago during Gemini launches.

"My husband is dead now, but he helped put on the shuttle's heat tiles," she said. "I wanted to come out and see it for myself."

The shuttle landed March 30 at White Sands Missile Range, New Mexico, a backup landing site that was chosen after heavy rainfall swamped Edwards Air Force Base in California's Mojave Desert. Four hundred Kennedy Space Center workers were scheduled to return late Tuesday night from White Sands, where they helped ready the shuttle for the flight back to Florida.

Except for a few dozen missing tiles and some brown scorch marks, the shuttle appeared unscathed by its eight days in orbit. With more than 5 million miles on the odometer, it still looked as good as new.

It took seven days for the shuttle to return to Florida this time, compared to 12 days after the second mission and 15 days after the first mission.

Most of that turnaround time was saved by draining toxic fuels in Florida, instead of New Mexico.

"We really didn't have the right equipment for that in New Mexico," said NASA spokesman Mark Hess. (SENTINEL STAR, 4-7-82, pp. A-1 & A-5)

March 8: Space agency engineers replaced a torn solar sail on an Indian communication and weather satellite Wednesday, confirming NASA's plans to launch at 1:48 a.m. Friday.

The sail, used to maintain a balanced temperature on the spacecraft, was delivered to Cape Canaveral Air Force Station from its manufacturer in Palo Alto, California, Wednesday morning. It took about eight hours to install it, said NASA spokesman Mark Hess.

A Thursday morning launch time was postponed after technicians noticed tears in the foil screen Tuesday.

The satellite, INSAT 1-A, is designed to provide a wide range of television broadcasts and weather emergency information to rural residents of India. (TODAY, 4-8-82, p. 10A)

<> On two fronts, Kennedy Space Center engineers are working to re-fit, re-shape and re-fly the Shuttle Columbia by June 27.

First, the 100-ton spaceplane was moved into its hangar at 11:05 a.m. Wednesday. Secondly, the two booster rockets designed to propel it into the upper reaches of the atmosphere were bolted together late that evening in another building.

Despite being two hours ahead of schedule processing the Shuttle for the fourth flight, the space agency was dealt one disappointment -- the cell-enzyme separation experiment spoiled.

"We haven't heard anyone say with 100 percent certainty that it didn't work. The astronauts reported the cells were separating," Welch said.

He said future pharmaceutical experiments are planned for the fourth and sixth missions to duplicate the research lost on the past mission.

With the Columbia now safely stored in its hangar, it will be the job of KSC technicians to strengthen as many as 822 heat protection tiles and replace 36 missing after the rigors of liftoff March 22.

"First there is a tile inspection and then a mapping out which tiles have to be removed and strengthened," said Mark Hess, NASA spokesman.

By April 16 the already assembled booster rockets will be attached to the Shuttle's 154-foot-high fuel tank and in late May all three components should be strapped together.

Hess said the biggest repair job inside the Columbia will be the toilet which broke down during the eight-day flight of astronauts Jack Lousma and Gordon Fullerton. (TODAY, 4-8-82, p. 16A)

April 9: The now familiar Space Shuttle decorates the cover of the 1982 Southern Bell phone directories that should be delivered to Brevard residents within two weeks.

TODAY photographer Scott Maclay shot the photograph at the November 12 Shuttle launch, and the newspaper provided the photograph to Southern Bell.

"The new cover is Southern Bell's way of recognizing the tremendous effort of all of those concerned in making Brevard the true space capital of the world," said Bell District Manager Pat Blumer. (TODAY, 4-9-82)

April 11: India's first operational satellite roared into space early Saturday atop a U.S. Delta rocket.

The twice-delayed launch of the INSAT-1 appeared to go off without a flaw on schedule at 1:47 a.m. (12:47 a.m. Chicago time).

The spacecraft, an unusual design to provide both telecommunications and weather information for the world's second most populous nation, is the first of two INSATs that

India is paying \$120 million to put into orbit. INSAT-II is scheduled to be carried aloft in 1983 by the space shuttle.

U.S. space technicians took advantage of a break in the foul weather that had plagued central Florida that previous two days to carry out the launch for India. There was a drizzle of rain as the rocket engine of the Delta ignited. One minute after liftoff, a pouring rain began. (CHICAGO TRIBUNE, 4-11-82)

April 12: A newly launched U.S.-built communications and weather satellite was beset by more trouble Sunday, failing to heed a radioed command to raise an antenna, Indian space officials said.

Master Control Command at Hassan, 300 miles west of Madras, said the problem-plagued spacecraft, launched from Cape Canaveral Saturday, said the sticky "C-band antenna," is one of the devices aboard the multipurpose satellite. Officials said maneuvers to put the satellite in its final stationary orbit had to be delayed at least 24 hours.

The 2,534-pound satellite was to have been launched Thursday but the liftoff was postponed when technicians discovered a damaged solar energy device. A Friday launch was scrubbed because of engine trouble aboard a U.S. plane which was supposed to monitor the launch. (TODAY, 4-12-82, p. 10A)

April 15: Think of it as a time machine -- where engineers and students of space science lay the groundwork for the next decade. The theories and papers proposed at each year's Space Congress in Cocoa Beach may become the space stations and voyages to the planets of the next decade or the next century.

The 19th annual Space Congress, to run April 28-30 at three locations, is dedicated to the notion that space can work for mankind. With three successful Shuttle missions under NASA's belt and a fourth proceeding on schedule, congress organizers believe space is no longer a forbidding realm.

It's there to be exploited. "After more than two decades devoted primarily to space exploration and experimentation, the time has come to reap the harvest of benefits," said

George Faenza, congress general chairman and director of McDonnell Douglas Technical Services at Kennedy Space Center.

A variety of panel discussions and papers will investigate areas once reserved for a convention of science fiction writers.

Manufacturing crystals for the electronics industry or artificial limbs in space, satellites that will supply solar energy to ground-based generators and international cooperation in building a space station are some of the subjects planned for discussion.

Panels will also feature future Shuttle astronaut Kathryn Sullivan and Spacelab pilot Owen Garriott.

Sponsored by the Canaveral Council of Technical Societies, the Space Congress is a non-profit symposium. So far registration is at a record 1,000, said congress organizer Melodie de Guibert.

Panel discussions and the delivery of scientific papers will be spread out over three locations: the Cocoa Beach Theater and Drafthouse..., Brassy's Nightclub..., and the First United Methodist Church of Cocoa Beach.

The congress banquet, at the Patrick Air Force Base Officers' Club, April 28, will feature Hans Mark, NASA deputy administrator. (TODAY, 4-15-82, p. 6B)

April 16: A TODAY special section devoted to the first Space Shuttle launch has won a top national award from the Aviation/Space Writers Association.

The "Shuttle Logbook," published in April 1981, prior to Columbia's maiden space voyage, was named the winner in the space category for daily newspapers of 200,000 and under circulation.

A \$100 honorarium and scroll will be presented to the newspaper at the association's awards banquet next month in Fort Lauderdale.

The 128-page section, one of the largest ever published by TODAY, represented a joint effort of several of the newspaper's editorial departments.

Nearly 50 stories and numerous photographs, charts and illustrations made up the section, which examined the Shuttle's past and future, explained details about the launch and space vehicle, and profiled key persons in the Shuttle program.

The bulk of the section was planned and designed by three editors: then-Aerospace Editor David Bailey, who now works for the Florida Times-Union in Jacksonville, Metro Editor Mike Bales and Features Editor Stella Clark.

(A copy of the "Logbook" referred to in this excerpt and subsequent logbooks are on file in the KSC Library Archives, Rm. 1533, Headquarters Building, KSC.) (TODAY, 4-16-82, p. 3B)

- <> Shuttle launch director George Page was reported recovering well from heart-bypass surgery Thursday evening, NASA officials said.

Page, 57, was expected to spend the night in intensive care at Shands Teaching Hospital in Gainesville. He was admitted to the hospital Tuesday following a routine medical checkup.

"The operation went well...and Page is expected to return to work in about a month," said Anne Skinner, a Kennedy Space Center spokeswoman. (TODAY, 4-16-82, p. 2B)

- <> Brevard Sheriff's agents say they have no leads yet in the burglary of a safe containing about \$10,000 from a Kennedy Space Center contractor.

"At this time we have nothing much. Our investigators are actively working on it. We are checking every aspect, including employees," said Sgt. Mike Linthicum of the Brevard Sheriff's Department.

The money belonging to Canteen Services, a space center contractor, was not government property, said Hugh Harris, space center spokesman.

Brevard County sheriff's agents who handled the burglary said it occurred between the closing of business April 2 and opening April 5.

Canteen Services supplies food services to all space center facilities. (TODAY, 4-16-82, p. 2B)

- <> Boeing Services International employee Sophia Cook put her ideas on a suggestion form and is now \$1,193 richer for the effort.

Cook, a heavy equipment fuel coordinator and locator in BSI's Heavy Equipment operation, saw a double effort being expended in two areas to accomplish preventive maintenance inspections and proofload testing.

Her suggestion to combine the proofload test with the annual preventive maintenance inspection task on 100 forklifts will eliminate the need for 100 extra computer entries without loss of history to the files.

Cook's suggestion reduced man hours needed to transport equipment from shop to shop and also reduced the amount of equipment downtime.

Cook joined The Boeing Company at KSC in 1971 and became a BSI employee in 1977. The suggestion award was made through BSI's Employee Suggestion Program. (SPACEPORT NEWS, 4-16-82, p. 2, Vol. 21, No. 8)

- <> "Hurrah for Us," is the cry from the KSC Toastmasters after winning top honors in the Area II Dramatic Reading and Annual Speech Contest, March 28, in Titusville.

Mary May placed first in the dramatic reading contest with her rendition of "Casey Jones." May will represent the KSC group in the Eastern Division contest on May 1.

Max Mundy placed second in the dramatic reading contest and Margie Whitney received second place honors in the speech contest for her ideas on "Where Have All the Patriots Gone?"

Toastmaster elections were held on April 1. Elected were Richard Miller, president; Margie Whitney, educational vice president; Nels Lovegren, administrative vice president; Mark Zuehsow, treasurer; Ashraf Mirza, secretary; John Troup, sergeant-at-arms. The officers will hold the positions for three months. (SPACEPORT NEWS, 4-16-82, p. 2, Vol. 21, No. 8)

April 17: The space agency announced Friday that former NASA official Gerald Griffin will replace Christopher C. Kraft Jr. as director of the Johnson Space Center in Houston.

The National Aeronautics and Space Administration's two main Space Shuttle offices will be merged, it was also announced.

The agency said Griffin will rejoin NASA from his position as vice-president of Scott Science and Technology, Inc., of Lancaster, California. He will work initially in Washington on Shuttle operations planning, transferring later to Houston to succeed Kraft, who has been Johnson's director since 1972.

Griffin previously served as deputy director of Kennedy Space Center in Florida and of Dryden Flight Research Center in Edwards, California, as a Houston flight director and as NASA associate administrator for external relations in Washington.

Kraft announced this week that he will retire late this year after SS Columbia's first operational mission, now scheduled for next November. Kraft was flight director of the early Mercury man-in-space missions and has left his imprint on all 34 U.S. manned space flights.

NASA also announced it is merging the Office of Space Transportation Systems and the Office of Space Transportation Operations, with the combined units adopting the name of the former. It will be headed by General James A. Abrahamson, currently chief of OSTs.

Dr. Stanley Weiss, administrator of OSTO, was named NASA chief engineer, succeeding Walter Williams, who is retiring. (HUNTSVILLE TIMES, 4-17-82)

April 21: Security and fire protection are among the essential tasks that Wackenhut Services, based in Coral Gables, Florida, performs at NASA's John F. Kennedy Space Center. A \$9.6 million supplemental contract recently awarded to the firm insures that they will continue to provide these fundamental services to the nation's spaceport.

The cost-plus-fee contract supplement carries a dollar value of \$9,628,389, bringing the total value of the Wackenhut contract at KSC to \$48,960,063. The supplement covers the period from when the contract was awarded on April 1, 1982, through October 31, 1982. (KSC RELEASE NO. 116-82, 4-21-82)

<> Space Shuttle engineers spent the weekend painstakingly moving the mammoth external fuel tank that stands 15-stories high and weighs as much empty as 15 Cadillacs.

With sensitive cranes, the engineers were able to adjust the tank by as little as an eighth-inch as it was fit snugly between the two booster rockets that will carry the Shuttle on its fourth mission.

Engineers also are specially treating 800 of the Columbia's heat protection tiles with an alcohol-like substance that will strengthen their bonds with the spaceplane.

Eventually all the Columbia's 32,000 tiles will be "densified" -- a process that hardens and smooths the tiles bottom surface, said James Harrington, chief of operations for Columbia at Kennedy Space Center.

"When we found out that some tiles were not sticking, the idea was to densify the back surface. Right now we're having the critical tiles densified. We'll do it incrementally," he said. Harrington explained NASA engineers now believe loose bonding caused 38 tiles to fall from Columbia during its March 22 liftoff.

NASA's second working spaceplane, the Challenger, will be built with all its tiles densified. The Challenger is expected to arrive at the space center's Shuttle hangar from its Palmdale, California, manufacturer by the third week of June.

The hardware that gave astronauts Jack Lousma and Gordon Fullerton headaches has been removed and sent to the manufacturer. The toilet, which clogged early in the mission, should be back at the space center within two weeks.

As many as 150 technicians are working in the Columbia's hangar around the clock. As of Tuesday, 846 tiles have been removed for repair and densification work. Technicians also have inspected the Shuttle's high pressure fuel pumps and have removed the main landing gear brakes for replacement.

Some dust and gypsum were found in the crew compartment -- leftover from the week spent on White Sands Missile Range after its recent landing, Harrington said. But the spaceship "looks in far better shape this time than it did after the first two missions," he said.

Inside the space center's Vehicle Assembly Building, the peach-colored external fuel tank and twin booster rockets are ready for attachment to the Columbia to start by May 16.

Bart Downey, KSC's manager for fuel tank operations, said more heaters -- designed to make sure no ice forms when engineers fill the tank with super-cold propellants -- will be installed before the fourth launch.

Engineers speculated pieces of ice may have damaged some tiles during the last liftoff.

As for meeting the June 27 launch date, NASA officials said they are optimistic, but a decision probably won't be made for at least another month.

Although a launch on July 4 has been discussed by top NASA officials, there is no indication the space agency will shoot specifically for that date. (TODAY, 4-21-82, p. 1A)

<> Work toward getting the space shuttle Columbia ready for its fourth test flight is going well, and NASA is still aiming for a late June launch, officials said Tuesday.

"The turn-around looks pretty good," said James Harrington, chief of orbiter operations. "Columbia looks in far better shape this time than it did after the first two missions."

Columbia's third mission began March 22 and ended on March 30, one day later than originally planned, at White Sands Missile Range in New Mexico.

It was flown back to Cape Canaveral on the back of a jumbo jet earlier this month.

Harrington said he saw no reason Columbia cannot go to the Vehicle Assembly Building in the middle of May for mating with its huge external fuel tank and its two solid-fuel booster rockets, which are already joined.

Harrington said the effort to increase the density of some of the shuttle's more than 30,000 heat-shielding tiles is also progressing well.

"We've started tile operations and already have 800 tiles off Columbia to be densified before they are put back on," he said. The 800 includes 38 tiles damaged during the last launch.

Several pieces of shuttle hardware are being replaced, including a turbo fuel pump in one of the three engines, officials said. (DAILY PRESS [from NASA CURRENT NEWS, 82-28], 4-21-82)

April 22: A future space shuttle mission will include a biology experiment devised by Winter Haven High School senior Aaron Gillette to test the effect of weightlessness on cells in a living saltwater sponge.

Aaron was one of 10 high school students from around the country whose experiments were accepted by NASA. The 10 spent two days this week touring Kennedy Space Center and

getting acquainted with NASA personnel. Other experiments will include testing the effects of weightlessness on arthritis and human body chemistry.

Aaron, 17, said Wednesday the results of his "fairly simple" experiment could provide biologists with a new understanding of the way cells in sponges and possibly the human body communicate among themselves.

The experiment, involving the common saltwater sponge *microciona porifera*, has never been tried in space, said William Knott, a NASA biologist assigned to oversee Aaron's experiment.

Aaron has high hopes the experiment will be aboard the fifth flight of the shuttle, tentatively scheduled for next November. The experiment is being sponsored by Martin Marietta's Orlando division, which will build the housing for the experiment.

Knott said the sponge often is used to demonstrate how cells grow back together if they are separated by mesh or chemicals. His experiment will test whether sponge fragments will reunite in space as they do on Earth.

Aaron thinks they won't grow back -- due to lack of gravity.

If they do grow together, Aaron said, that will show that the cells of the sponge have some other means of "intercellular communication" in addition to gravity.

The results of the experiment could shed some light on how cells in general, including those in the human body, communicate with each other, he said.

"It's hard to see any application this would have now. We're just learning about a process...A lot of work has been done on this sponge, but not much progress has been made on intercellular communication."

Aaron plans to major in biology at Western Carolina University at Cullowhee, N. C. (SENTINEL STAR, 4-22-82, pp. C-1 & C-5)

April 26: Wearing jet-powered backpacks and wielding giant wrenches, space shuttle astronauts will try to replace three blown fuses aboard a crippled satellite in 1984.

The rescue mission will cost at least \$45 million, not including the expense of launching the shuttle. It is tentatively scheduled for the 13th shuttle flight in March, 1984, but NASA is still trying to convince Congress that the Buck Rogers-style repair job is worthwhile.

The stricken satellite, called Solar Max, was launched two years ago. Three fuses burned out in July 1980, sending the 5,200-pound observatory spinning out of control and damaging four of seven scientific instruments that monitor the sun's activity.

If NASA goes ahead with the repair mission, it would be the first time a satellite has ever been recovered in space. The tricky retrieval operation is expected to play a major role in top-secret military launches in 1985, /Don/ Turner said. /Turner is program manager for the repair mission/. (THE ORLANDO SENTINEL, 4-26-82, pp. A-1 & A-8)

April 28: More than 1,000 engineers, scientists and students of space sciences are expected to participate in the 19th annual Space Congress, which opens in Cocoa Beach today.

These annual sessions, sponsored by the Canaveral Council of Technical Societies, gives some of the top minds in the fields of space sciences the opportunity to focus on the future. And there's no "place" more certain to be involved in mankind's future than outer space.

In the past, most of our manned space effort has been devoted to merely getting there and back safely. But we're progressing toward the day when the journey will become insignificant in relation to the purpose of the mission while in orbit -- be that scientific experimentation, medical research, industrial manufacturing or some other job beneficial to people on Earth.

"After more than two decades devoted primarily to space exploration and experimentation, the time has come to reap the harvest of benefits," says George Faenza, director of

McDonnell Douglas Technical Services at the Kennedy Space Center. He is general chairman of this year's Space Congress.

A variety of panel discussions and presentations of technical papers on space topics will be presented at three locations during the three-day event.

As well as engineers and scientists, panels will include future Shuttle Astronaut Kathryn Sullivan and Spacelab pilot Owen Garriott.

Featured speaker at tonight's banquet, which will be held at the Patrick Air Force Base Officers' Club is Hans Mark, NASA deputy administrator.

Last year Mark expressed an open-minded attitude about restudying the idea of relocating NASA's mission control operation from the Johnson Space Center in Houston to the Shuttle's future operating base at KSC. Perhaps we're a bit prejudiced, but we think that is a move that makes sense. We hope he will play an instrumental role in helping bring about that logical consolidation. (TODAY, 4-28-82, p. 12A)

April 29: A space platform that would unfold in orbit like a butterfly and grow giant solar wings was the hot topic at the 19th annual Space Congress.

"It's a natural outgrowth of the shuttle program," Dr. Hans Mark of NASA told reporters Wednesday night before addressing 500 participants at the space conference at Patrick Air Force Base.

Mark said whether or not Congress commits funds for a space platform, "we're going to go out and do it."

Mark said he hopes a space platform would be placed in orbit in this decade.

He said the National Aeronautics and Space Administration had not yet presented a firm proposal to Congress because "we don't know which way we're going to go yet."

The Soviet Union announced April 20 it had placed a new space station, Salyut 7, in orbit. An earlier space station, the Salyut-6, reportedly is slipping from orbit after having been closed down during the last manned Soviet mission in May 1981. It had been home to 16 cosmonaut teams, including Soviets Valery Ryumen and Leonid Popov, who set the space endurance record of 185 days in 1980.

Mark, who served as secretary of the Air Force from 1979 to 1981, found fault with the Soviet program, saying they should first develop a reusable space shuttle.

"The Russians are going at it backward," he said.

The Space Congress is an annual symposium dedicated to the exchange of space science and technological information. It draws NASA, military and private industry specialists who present technical papers, conduct panel discussions and give speeches.

Engineers for two NASA contractors, TRW, Inc., and McDonnell Douglas Corp., discussed prototypes for the space platform, which could be used to launch, deploy, retrieve and maintain satellites or other spacecraft.

Larry Morata of McDonnell Douglas said the basic space platform would go up on the shuttle while folded in a cocoon fashion. Once in orbit, the shuttle's robot arm would place it in space and help to unfold it "butterfly fashion," he said.

Additional shuttle flights then would bring more modules and "wings, legs and feet, which would be added to make the platform grow eventually into a manned space station," Morata said.

Marshall Norvick of TRW said space scientists are seeing "more and more interest in the commercialization of space." The platform would allow versatile operations such as Earth observation stations, an infrared telescope beam developed for the shuttle and astronomy and weather satellites, he said.

Peter Goldsmith of TRW and Martin Gerbasi of Lockheed Inc. presented a technical report on the development of "solar power wings" to be added to space platforms to provide the

heavy power demands necessary for their different functions. Sufficient power is especially important in placing satellites in higher orbits from the platforms.

The NASA contractors are working on the development of light-weight, fold-out designs of solar power panels, which would be attached to the space station in modular form. These would permit flexibility and greater efficiency in the operations of the space station. (THE TIMES-HERALD, 4-29-82)

<> The first Florida landing of the space shuttle may be postponed until early 1983, NASA officials said Wednesday at the 19th Space Congress.

Under the current flight schedule, the Columbia would land in Florida in November, after its fifth trip into space. But the space agency may switch that landing to Edwards Air Force Base in California for a test of the shuttle's ability to land in a crosswind.

A California landing also would put the shuttle within towing distance of the Rockwell International assembly plant in Palmdale, California, where it will undergo major modifications after the November flight. The Rockwell plant is 36 miles from Edwards.

The Columbia will be out of commission for seven months while Rockwell workers remove the ejection seats, update the cockpit controls, strengthen the fuselage and beef up the three main rocket engines. It will rejoin the fleet in July 1983.

In the meantime, the space shuttle Challenger will fly its maiden voyage in January 1983, with a scheduled landing in Florida.

The three-mile concrete runway at Kennedy Space Center was built as the shuttle's primary landing strip, but so far only training jets have touched down there. No decision will be made on a Florida landing until the shuttle returns from its fourth mission in June, said Glynn S. Lunney, manager of the space shuttle program.

"It all depends on where we stand in terms of flight experience," Lunney told 1,100 delegates attending the three-day convention. (THE ORLANDO SENTINEL, 4-29-82)

<> The Space Shuttle Enterprise, now used for tests at Edwards Air Force Base, California, almost became a World's Fair exhibit in Knoxville, Tennessee, but NASA officials found two drawbacks.

First, it was too expensive a proposition flying it on the back of a Boeing 747 across the country, and "we'd have to knock down too many bridges" getting it to the fair grounds, said NASA Deputy Administrator Hans Mark.

Mark, attending the 19th Annual Space Congress banquet at Patrick Air Force Base Wednesday night, said when the World's Fair opens Saturday, visitors will have to settle with a 12-foot-long model.

Glynn Lunney, manager of the Shuttle program at Johnson Space Center in Texas, said Tennessee Senator Howard Baker asked the space agency to explore the prospect of bringing the 122-foot-long Enterprise to the fair.

While the Enterprise never flew in space, it was used for landing and gliding tests in 1977.

"He (Baker) asked us to look into the cost and logistics but it was prohibitive," Lunney said. (TODAY, 4-29-82, p. 14A)

April 30: NASA's John F. Kennedy Space Center has awarded a \$1,558,420 contract modification to International Business Machines Corporation, 7900 North Astronaut Boulevard, Cape Canaveral, Florida, for additional services under an existing contract.

IBM is presently under a three-year contract extension with KSC for systems engineering and software development services in support of the Launch Processing System used at the Spaceport for automated checkout and launch of Space Shuttle vehicles. This award, for additional work under that existing contract, brings the total value of the contract to \$85,913,954.

The cost-plus-award-fee contract modification covers the period from January 19, 1982, through September 30, 1984. (KSC RELEASE NO. 118-82, 4-30-82)

- <> Preparations for the Space Shuttle's fourth and final development test flight, now scheduled for late June, are establishing new records as expertise in Shuttle turnaround grows.

Already, the massive external tank that stores the super cold propellants burned by the orbiter Columbia's three main engines, has been attached to the twin solid rocket boosters in the Vehicle Assembly Building. The mating of the tank to the boosters on April 16 and 17 was performed in record time, in 4.5 work shifts -- compared with six shifts for STS-3.

Meanwhile, technicians have been working around-the-clock to get the reusable Columbia spaceship ready for its next flight, a 7-day mission that will complete the shakedown of the shuttle orbiter and booster systems as the nation's space transportation system becomes operational with flight five.

Since Columbia's April 7 return to the hangar-like Orbiter Processing Facility, workers have completed three major operations: removal of the OSS-1 cargo carried onboard Columbia's third flight; draining of residual hypergolic propellants from steering modules located at the forward and aft ends of the reusable craft; and removal and inspection of high pressure fuel pumps on each of the orbiter's three main engines.

Another system getting a lot of attention is the orbiter's complex network of thermal insulation tiles. About 1,000 of the fragile tiles will be taken off Columbia. About 800 of the tiles that are removed will be densified. This process strengthens the bond of the silica tile to the felt shock-absorbing isolation pad bonded to the spacecraft's aluminum skin. Other tiles will be pulled off because they were damaged in flight, or are to be analyzed.

The orbiter's toilet has also been removed and shipped back to its builder. During Columbia's third flight, the sophisticated space "potty" would not operate properly at

its highest speed. And the S-Band communications transponder that failed during the extended third flight has also been returned to its vendor for analysis.

On April 24, Columbia was shut down from active testing for about a week. While the orbiter was powered down, a heat interchanger on one of its sophisticated cooling systems was scheduled to be replaced, and changes that are peculiar to the STS-4 mission were to be made. The primary cargo on the Columbia for its fourth trip into space is a Department of Defense payload.

Columbia is scheduled to spend roughly two more weeks in the OPF before it is ready to be moved to the VAB for mating to the external tank and booster rockets. Only eight days of work are planned in the VAB, before the vehicle should be ready for its 3.5 mile "crawl" to the launch pad.
(SPACEPORT NEWS, 4-30-82, pp. 1 & 2, Vol. 21, No. 9)

- <> The operational era of the Space Shuttle moves closer with a pathfinder vehicle for the Inertial Upper Stage now at KSC.

Known as the IUS, the vehicle is designed to transfer heavier cargo from low earth orbit to altitudes beyond the orbiter's reach. Interface testing and electrical checkout of the inert pathfinder is now underway in the Vertical Processing Facility. The IUS does double duty by being usable on either the Space Shuttle or the new Titan 34-D rocket to be launched by the Air Force.

IUS is a solid fuel stage capable of carrying a satellite weighing up to 5,000 pounds into geosynchronous orbit or boosting spacecraft on interplanetary trajectories. During a Space Shuttle initiated mission, the IUS/spacecraft combination will be in the cargo bay. After reaching low earth orbit it will be ejected from the orbiter and the IUS will be ignited, functioning as an expendable stage.

Unlike the single-stage Payload Assist Module (PAM) used for lighter payloads, the Inertial Upper Stage is a two-stage vehicle. But like PAM, the solid propellant concept was also chosen for IUS because of lower cost, compact design, simplicity, and inherent safety.

The Space Division of the Air Force Systems Command, developer of the vehicle, has awarded a contract to Boeing Aerospace Company for building nine IUS flight vehicles to be used during the 1980's.

The first Space Shuttle launch of the Inertial Upper Stage is planned for STS-6, scheduled for January, 1983. It will boost the first Tracking and Data Relay Satellite into geosynchronous orbit from Orbiter Challenger, which will be making its maiden flight. (SPACEPORT NEWS, 4-30-82, p. 4, Vol. 21, No. 9)

<> Believe it or not, the word "space" was once an Air Force no-no, recalled Dr. Charles A. Berry, former chief medical director of the nation's space program and long-time personal physician to the astronauts.

Chuck Berry revisited Brevard to speak to an overflow banquet crowd Friday night /April 30/ at Indiantic's Holiday Inn Oceanfront.

Noting the cigarette smokers and the wine bottles on the tables, Berry -- who is founder and president of the National Foundation for Prevention of Disease -- commented to the assembled Missile, Space and Range Pioneers:

"If there was ever an outfit that needs preventive medicine..."

He reminded the pioneers -- many of them former colleagues -- of days when, within the Air Force, "you couldn't say that word ('space') and you couldn't write it on a piece of paper anywhere."

There once were "great arguments carried on about whether it should be only monkeys" flown into space.

"We had a fantastic number of arguments with some very erudite people and people in some very high places in government who said we really should not fly man."

...Monkeys were flown. One was Enos, said Berry, "and this monkey was very instrumented and had catheters in almost every place you could put them -- we made a few holes that weren't there and put some more in. And we put a little thing around his waist so that he couldn't get to them to tear them out."

The happy excitement of seeing Enos' electrocardiogram, the first from space, was short-lived.

"When we saw that electrocardiogram we wished we'd never seen it, because it had premature ventricular contractions, extra beats, thrown all through the damn thing. And we said, "...we're really in trouble. Maybe those people (the doubters) were right...."

When Enos returned from space, Berry had to pick him up..."and, boy, was he mad! He had torn out all the catheters and things and he wanted to tear me out too!"

Examination showed a catheter "was tickling the side of his heart, and every time it tickled his heart he got a premature ventricular contraction. It didn't have anything to do with being in space at all, it was just the damn instrumentation..."

...In 1979, Berry was nominated for the Nobel Prize for, among other things, "his pioneering efforts and discoveries concerning man's capability to adapt to the space flight environment," states a biographical note.

But Berry still has an eight-page list of the awful things people said would happen if man were weightless (he'd never sleep, he'd do nothing but sleep, etc.). "It was so ridiculous you didn't know what to believe."

Nevertheless, Project Mercury was initiated.

"Al Shepard was put in a spacecraft to fly -- and that was only after we had spent two days arguing with the president's scientific advisers, textbook writers, all sorts of people like that, who said, 'He's going to have a heart rate of 180, he's going to go into cardiac failure...'

"If it had not been for President Kennedy, who overruled his scientific advisers, we probably would not have launched," Berry said. (TODAY, 5-2-82, p. 1B)

MAY 1982

May 3: Colombia vaulted into the space age last month with the signing of a contract to use the Space Shuttle to boost Latin America's first domestic telecommunications satellites aloft.

The contract with the National Aeronautics and Space Administration reserves space for Colombia's first Satcom satellite on a June 1985 shuttle flight.

Colombian Minister of Communications Antonio Abello Roca -- in Miami Beach for a trade show -- said Colombia's second satellite will probably be launched in 1986. (THE MIAMI HERALD, 5-3-82, p. 38)

May 5: NASA has awarded IBM Corp., Cape Canaveral, a \$1.6 million contract modification on its present three-year contract with Kennedy Space Center for systems engineering and software development services. (TODAY, 5-5-82, p. 14C)

May 7: Space agency officials searched Thursday for ways to cut \$600 million from their 1983 budget without crippling the space shuttle program.

A budget freeze backed by congressional Republicans threatened NASA with drastic delays in shuttle launches and construction, shut and elimination of funds for the space telescope, the Voyager interplanetary probes and an unmanned mission to Jupiter in 1985.

"If we took a \$600 million hit, the shuttle would certainly be affected," said NASA spokesman Miles Waggoner in Washington. "There's no place else where we could come up with that kind of money."

A budget compromise approved late Wednesday / May 5 / by the Senate Budget Committee would hold NASA to its 1982 funding of \$6 billion. President Reagan's originally requested \$6.6 billion for the space agency, with roughly \$3.4 billion earmarked for the shuttle.

NASA Administrator James Beggs talked with his staff Thursday on possible ways to cut space spending. Beggs has said repeatedly that the shuttle is NASA's top priority and must receive full funding.

"They've got hard choices to make and they're not made quickly," Waggoner said. "It's all at the 'what if' stage right now. Nothing is definite yet." (THE ORLANDO SENTINEL, 5-7-82, pp. A-1 & A-9)

May 9: Plans to land the Space Shuttle Columbia at Kennedy Space Center after its fifth flight this fall apparently will be scrapped, a space agency spokesman said Saturday.

Hugh Harris, public information chief for NASA, said a proposed early morning Shuttle landing after the fourth mission, scheduled for late June, probably will not provide a cross wind.

NASA wants to test the Shuttle in cross winds on its broad landing strip in the California desert before landing it on the narrower concrete runway at KSC.

The Shuttle's seventh mission in the spring of 1983 probably will be the first to return to KSC, Harris said.

The announcement is bad news for those who count on Shuttle missions to boost tourism. A combination Shuttle launch and landing at KSC was expected to attract even more tourists to the county.

Harris said NASA won't get a chance to test the Shuttle's ability to land in cross winds because the sixth flight will be carried out by Challenger, the second in the planned four-Shuttle fleet. Harris said that since it will be Challenger's first mission, NASA planners want to bring the spacecraft down in California. (TODAY, 5-9-82, p. 1A)

May 9-15: KSC is celebrating Small Business Week May 9 through 15 to recognize the tremendous contribution Kennedy's small business contractors make to operations here.

"We're helping to build America" is the theme for this year's Small Business Week. Norm Perry, Industry Assistance Officer and Small Business Specialist at KSC, said, "Everything we do here is touched by small business; even the big prime contractors have to have the support of small business."

KSC awarded more than \$67 million in contracts to small businesses in fiscal year 1981, for 14.25 percent of total contract awards. "We need lots of small items done quickly and small businesses are invaluable in providing that work," said Perry.

Small business support companies at KSC are Atlantic Technical Services -- Mail and Distribution; BAMSI -- Key punch Operations (minority owned); Bionetics Corp. -- Standards and Calibration Laboratory, Support and Environmental Monitoring; Expedient Services -- Roads and Grounds; McGregor & Werner -- Printing and Reproduction; New World Services -- Library Sciences (woman owned); Unified Services -- Custodial Services (minority owned); and Wiltech of Fla., -- Component Refurbishment and Chemical Analysis.

The major local small business support companies are Holloway Corp., Titusville, providing modification to the O & C Building; Ivey's Steel Erectors, Inc., Merritt Island, for modification to the Life Science Support Facility; Precision Fabrication & Cleaning, Sharpes, for refurbishment of the tube-bank trailers and W & J Construction Corp., Cocoa, for modifications to Pad B, LC-39. (SPACEPORT NEWS, 4-30-82, p. 2, Vol. 21, No. 9)

May 11: NASA will form a special task force this month to develop plans for orbiting a permanently manned space station by /1990/, space center officials have announced.

The proposed 15-member task force is the space agency's biggest move toward building the outpost which could cost more than \$4 billion.

In space chronology, the move is not without precedence since both the Space Shuttle and the Skylab programs started with NASA task forces.

Unless a space station is built, it could mean massive layoffs for the engineers who designed the Shuttle, NASA officials say.

"We can't afford not to build it," says Terry Finn, deputy director of industry affairs in Washington. "If NASA doesn't think about its future, it won't have a future." (TODAY, 5-11-82, p. 12A)

<> The Prudential Insurance Co. of North America has thrown its multibillion dollar corporation behind the private financing of the nation's Space Shuttle program, the Wilmington, Delaware, MORNING NEWS reported in today's editions.

In a copyright story, company officials said Prudential's board of directors approved buying into Space Transportation Co. last month.

Space Transportation Co. is the Princeton, New Jersey, firm that has proposed buying a fifth billion-dollar Space Shuttle for NASA in exchange for the worldwide marketing rights for commercial cargo space aboard the entire five Shuttle fleet.

Prudential spokesman Joseph Vecchione told the MORNING NEWS that the company "now holds an equity interest in Space Transportation Co." (TODAY, 5-11-82, p. 1A)

May 13: Someone forgot to tell John Young that he's being grounded.

Visiting Orlando Wednesday, the 51-year-old astronaut said no one has told him that his space shuttle mission in September 1983 will be his last, even though the announcement was made two weeks ago.

Young, who commanded the shuttle Columbia's maiden voyage a year ago, said he has no plans to hang up his spacesuit.

"Not if I'm healthy," said the five-flight space veteran. "Why would I retire?"

Young's retirement from active duty was announced April 29 by General James Abrahamson, associate administrator of NASA and head of the shuttle program.

Asked whether NASA had too many astronauts, Abrahamson told the House Subcommittee on Housing and Urban Development that many older astronauts -- including Young -- would fly one more mission before retiring or taking other positions in the space agency.

The retirements would will give younger members of the 78-member astronaut corps a chance to gain flight experience, Abrahamson said.

Young was recently picked to fly the ninth shuttle mission, when a six-man crew will perform 75 experiments in a Spacelab, a laboratory carried in the Columbia's cargo bay. He heads the astronaut corps.

Officials at Johnson Space Center in Houston were not aware of any decision to ground Young and wondered if there was some mistake. Abrahamson could not be reached for comment Wednesday.

Young was appearing in Orlando at a conference of the Association of Educational Data Systems. (THE ORLANDO SENTINEL, 5-13-82, pp. E-1 & B-7)

May 14: A cluster of blocky, corrugated steel shaped stands in a sandy field at Complex 39, huddled like a flock of angular sheep shielding themselves from the sun.

The growing gaggle of whitewashed rail cars, freight carriers that once plied the rails of the Kansas-based Atchison, Topeka and Santa Fe Railway Company, is a collection of retirees. Sixty-four cars, decommissioned to make way for new and larger rolling stock, have been given a new lease on life -- as offices for more than 300 KSC contractor and Civil Service employees.

"The complex is designed to be located (across from the VAB) for about three years, then it will be moved out to Pad B when that becomes operational," said Terry Krzywicki, design engineer for the project.

Raw material for the endeavor rests on a rail siding adjacent to Contractor Road, a long line of dusty veterans with the bulk of the Vehicle Assembly Building looming over them like a shepherd watching his flock. There is no hint here of the modern office complex this will become.

"Boxcar City" was born out of the need to provide replacement housing for workers to be moved from operational areas of Complex 39. Some will be moved out of the VAB because their functions don't demand accommodations that close to ordnance operations. Others will move to free firing room space in the Launch Control Center.

A permanent facility appeared to be the long-term solution, but an interim step was needed -- preferably to provide something that could be relocated and reused elsewhere.

Planners fell back on a solution for an earlier need. At Launch Pad A, the shock wave from a launch would damage standard prefabricated steel structures.

Sturdier railroad boxcars, provided a good trade-off against the cost of permanent facilities stressed for the location, and proved able to withstand conditions ranging from rocket exhaust to hurricane force winds that would damage or blow away conventional trailers. After three launches the cars, sited only 300 yards from the pad, have shown few effects from the Shuttle's earthquake-like vibrations, except for a few minor fixtures that were shaken loose.

While regarded as portable and "temporary," the boxcar units are expected to far outlive conventional trailers.

"These cars have been traveling all over the country for 20 to 30 years, and since they're still in this shape, you can see how long they'll last," said Bob Pastermack, project engineer for the complex.

A "long time," engineers say, could be two to four times the five year average life of a conventional trailer in the same application.

And with long service comes another bonus -- lower energy consumption and cost.

"Boxcars are better insulated than trailers," said Ted Hyatt, who works in the Energy Conservation Project Office. "They don't have windows, and centrally located air-conditioning and heating facilities help energy efficiency." Utility costs can be as little as half of those experienced in trailers. To relieve the blandness of the flat, white exteriors, the boxcar side on each row that faces the VAB will be painted in red, gray and white stripes, and crowned by a silhouetted orbiter on one end.

As the renovation proceeds through the four-month process, the once stark interiors will be refurbished into surroundings that will rival many commercial office buildings. (SPACEPORT NEWS, 5-14-82, p. 3, Vol. 21, No. 10)

May 17: NASA's Kennedy Space Center recently began installation of experiments on the Spacelab 1 pallet in preparation for the first flight of the European Space Agency-developed Spacelab, scheduled for September 1983.

Configuration for the first flight, a seven-day joint NASA/ESA mission, will consist of a manned habitable module and the experiment-supporting pallet. One European and one American payload specialist will fly on the mission, along with the commander, pilot and two astronaut mission specialists.

Ceremonies marking the delivery of the first European Spacelab payload to NASA were held May 7 at facilities of ERNO, Spacelab prime, at Bremen, West Germany.

Spacelab 1 will carry 36 different instruments, 12 provided by NASA and 24 by ESA, including a metric camera, microwave remote sensing equipment, fluid physics module and the material science double rack (which itself contains 33 different experiments). (DEFENSE DAILY, 5-17-82, p. 87, Vol. 121, No. 11)

<> Scheduled space shuttle orbiter end-of-mission landings at the Kennedy Space Center, Florida, have been delayed until Mission 7 in April, 1983, under project planning that adds to the conservatism of the program for evaluating the landing characteristics of orbiter vehicles.

Earlier planning scheduled the first Kennedy end-of-mission landing for Flight 5 to be launched this November. The concept of slipping planned Kennedy landings has been gaining momentum for some time.....

.....Edwards' concrete Runway 22 offers under-and over-run advantages that do not exist at the Kennedy runway....
(AVIATION WEEK & SPACE TECHNOLOGY, 5-17-82, p. 25, Vol. 116, No. 20)

- <> Two Shuttles will be roaring off launch pads at Kennedy Space Center every month by 1987, says the man who supervises activities at the nation's space port.

While his reusable spacecraft team prepared Columbia for its fourth and final test mission in late June, KSC Director Richard Smith talked confidently of launching 24 Shuttles annually in five years and 30 per year by 1992.

Columbia will be joined by three more Orbiters -- Challenger in mid-June, Discovery in 1983 and Atlantis in 1984.

Three will take off and land at KSC's billion-dollar installation, with its work force of 12,000. A fourth will operate out of Vandenberg Air Force Base, California, beginning in 1985.

Smith, 53, a veteran of 31 years in rocket and space development, said in an interview that his experts are busy pinpointing ways to cut down the processing time between Shuttle flights -- a necessity in achieving higher launch rates.

"We want to make turnaround time as short as we can," he said. "I'm pleased with the faster pace here."

He noted that seven months elapsed between Columbia's first and second missions in 1981 and four months between the second and third flights. He expects the spacecraft to be ready this time in 90 days.

"We can reduce ground time to 60 days and later to 45 days," Smith said. "But to do that requires improvements in ground

and flight equipment. We haven't yet identified all the areas where changes must be made."

By early 1983, when Challenger makes its debut, Smith said KSC would be able to move faster than Johnson Space Center in Houston, which develops flight plans, trains astronauts and updates mission control computers for every Shuttle flight.

In that event, Johnson would have to speed up its operations or Kennedy engineers slow down theirs, but he didn't elaborate.

Meanwhile, the Air Force is building facilities at Vandenberg AFB, which is better suited geographically to launch Shuttles on polar orbits. These orbits expose more of the Earth to military satellites carrying sophisticated cameras and sensors.

Smith said his experienced launch teams will prepare several Shuttles for the Vandenberg missions, ferrying them from Florida when they are ready for launch. KSC engineers and technicians will travel to California to assemble huge solid rockets that augment Shuttle thrust.

"The real issue in military usage is the long range defense requirement," Smith said. "They may need a dedicated Shuttle fleet for space missions."

In such a case, Smith believes it would be easier for NASA to set up a "quasi-commercial operation" at KSC to process Shuttles for domestic and foreign civilian use.

And NASA is already moving to do this with a proposal to consolidate all of the processing work under one civilian aerospace contractor.

This would release several hundred government personnel for other assignments and more advanced projects.

A three-Shuttle fleet requires more facilities.

By 1985, Smith's crews will have modified a second pad, used in the moon launches, for the Shuttle.

And one or two additional bays will be equipped in the cavernous Vehicle Assembly Building, where Shuttles are mounted vertically with solid rocket boosters and fuel tanks before transfer to launch pads.

Smith believes the next logical project for NASA is a manned space station, assembled in orbit from sections carried in Shuttles. The reusable spacecraft would also ferry personnel and supplies.

"KSC will play a big role in any future station," he said. "The expertise acquired here in ground servicing of (space) vehicles and spacecraft is invaluable. The same techniques are applicable to a permanent facility in orbit."

Does he anticipate the transfer of Shuttle mission control operations from Houston to KSC?

"You don't move highly specialized facilities and a large group of people," he said. (TODAY, 5-17-82, pp. 1A & 8A)

May 18: NASA's John F. Kennedy Space Center has awarded a \$7.2 million contract to W & J Construction Company in Cocoa, Florida, to construct a complex of new buildings to process and store solid rocket booster segments.

Under the terms of the fixed-price contract, W & J will provide the labor, equipment and materials to construct the Solid Rocket Booster Rotation/Processing Facility and two SRB Segment Storage Buildings. The award was made to a small business firm. Construction of the facilities is to take about 18 months.

Live solid motor segments arriving at Kennedy Space Center for assembly are now received, processed and inspected in the Vehicle Assembly Building. The aft skirts and aft propellant segments of the solid rocket boosters are also currently assembled in the VAB. Moving these operations to a separate building will reduce hazardous conditions in the VAB and speed shuttle turnaround time by eliminating scheduling conflicts between the hazardous solid rocket booster rockets.

When complete, these facilities will enable KSC to store two sets of solid rocket boosters and to support more than 20 launches a year. (NASA RELEASE NO. 128-82, 5-18-82)

<> Work on a second Space Shuttle, the Challenger, is nearing completion and the ship will be delivered to NASA late next month, the manufacturer, Rockwell International, said Monday.

The 100-ton spaceship is scheduled to roll out of its assembly plant in the desert near Palmdale, California, about June 30, company spokesman Jerry Syverson reported.

Then it will be towed over a desert highway to nearby Edwards Air Force Base -- a half-day journey -- to be mounted atop a Boeing 747 jumbo jet for a flight to the launch base at Kennedy Space Center.

The ship's first liftoff is scheduled for January.

Challenger may still be at Edwards when the first Shuttle, Columbia, returns there from its fourth trip into space.

The third and fourth Shuttles, Discovery and Atlantis, are to be completed in 1983 and 1984, respectively.

Each is designed to make 100 or more roundtrips into space. (TODAY, 5-18-82, p. 12A)

May 19: Space veteran Columbia's journey of only 300 yards from its hangar to the neighboring Shuttle assembly building was on hold by early today.

NASA officials predicted it wouldn't be until early this morning before the Columbia would be towed to the building where it will be attached to its already joined fuel tank and twin booster rockets.

Slower than expected preparations inside the hangar were responsible for the delay. The move was also delayed by a welding job on a fractured Columbia main engine valve.

The valve in the No. 1 main engine is designed to supply gaseous oxygen to the engine. The oxygen keeps the engine at a pressure necessary for the flow of fuels.

Hairline fractures were discovered in the valve over the weekend and the repair was accomplished by Monday, said Mark Hess, a Kennedy Space Center spokesman. But, Hess said, the problem "threw a kink in the works," and set the Columbia schedule back 12 hours.

By late Tuesday, a six-hour procedure for weighing Columbia was about half complete, Hess said. Weighing the Shuttle is essential to enable engineers to predict engine performance. Once the Columbia was secure inside the Vehicle Assembly Building, it was to be hoisted into a sling and bolted to the fuel tank and rockets.

Hess said Tuesday's delay would not affect the move of the fully assembled Shuttle to launch pad 39A on May 26 or the start of the seven-day mission on June 27.

"There is time built into the schedule to catch up, if needed," said space center spokeswoman Ann Skinner. "But a decision on the actual launch date is not expected to be made until the Shuttle leaves the VAB for the pad."

Carrying a secret Department of Defense cargo, Columbia will be manned by Henry Hartsfield and Thomas Mattingly for the last of four test flights. (TODAY, 5-19-82, p. 12A)

<> A European Ariane rocket will lift the communications satellite WESTAR VI on its 1983 mission because it's cheaper than America's Delta rocket, a Western Union official said Tuesday.

"Ariane Space (the European agency) offered us such an attractive package that we couldn't turn it down," said William Zeigler, launch operations manager for Western Union.

WESTAR VI will be carried into space in December 1983. (THE ORLANDO SENTINEL, 5-19-82, p. B-6)

May 22: Astronauts Thomas Mattingly and Henry Hartsfield remained tight-lipped Friday about the military cargo they will fly into orbit next month aboard the space shuttle.

"I think we just ought to stay off the DOD subjects," said Mattingly, the 46-year-old commander of the Columbia's fourth test flight and an Apollo 16 veteran.

In their final press conference before a scheduled June 27 launch, Mattingly and Hartsfield called the shuttle a "freeway to the future" and predicted heavy commercial traffic for America's "space truck."

But they brushed off questions about the shuttle's first paying customer, which is the Pentagon, and defended the role of the military in space.

"Space is a place, no different than the oceans and earth we live on," said Mattingly, interviewed via closed-circuit television from Johnson Space Center in Houston. "Whatever social and political things go along with people also go on in space." (THE ORLANDO SENTINEL, 5-22-82, p. A-1)

May 23: If the U.S. Air Force doesn't start paying its fair share of Space Shuttle costs, the nation's space program faces a possible financial crisis, key members of the House Science and Technology Committee say.

"The military has been getting a free ride," said Rep. Don Fuqua, D-Fla., committee chairman.

Fuqua said without more money for the Shuttle program -- especially from the military -- NASA will fall into debt, forcing cuts in some of the agency's non-Shuttle programs.

"It's a financial bind," he said. "And the losers will be the things like aeronautics research and planetary programs." (TODAY, 5-23-82, p. 1A)

May 24: NASA's John F. Kennedy Space Center has awarded the Watson Paving, Inc. of Cocoa Beach, a \$348,568 contract to resurface the northbound lanes of Kennedy Parkway, Florida Route 3.

The paving will include the nine mile section of road between the intersections of Routes 3 and 405 near the Space Center's Industrial area, to Gate 4 south of Florida Road 402 (the beach road).

Work under the fixed price contract is underway and is due to be completed by August 10. The award for this contract is set aside for small business firms. (KSC RELEASE NO. 138-82, 5-24-82)

<> NASA's John F. Kennedy Space Center has awarded Atlantic Technical Services of Longwood, Florida, an extension valued at \$613,366 to its current contract for providing mail services for the Space Center.

ATS is responsible for the operation of the postal and in-house distribution services for the entire Space Center.

Classed as a small business firm, ATS is in its second year of providing mail and distribution services in support of NASA and contractor elements at the Kennedy Space Center. This extension will cover the period through October 31, 1982.

The new award brings the aggregate value of the parent contract to \$2,535,504. (NASA RELEASE NO. 135-82, 5-24-82)

<> The Space Shuttle Orbiter Columbia was moved from the Orbiter Processing Facility to the Vehicle Assembly Building at Kennedy Space Center last week and mated to its solid rocket boosters and External Tank in the VAB. The mated vehicle is scheduled to be rolled out to Launch Pad 39A on May 26 with launch planned for June 27. The STS-4 mission will be piloted by astronauts Thomas Mattingly and Henry Hartsfield, with landing scheduled July 4 at Edwards AFB, California. This final Shuttle R & D flight will mark the launch of the first DOD cargo into space by the Shuttle (DOD 82-1). The DOD payload will reportedly include the Martin-built Space Sextant and Air Force instruments

designed to define the infrared and ultraviolet signature of the Earth's horizon and to measure the environment near the Orbiter. (DEFENSE DAILY, 5-24-82, p. 125, Vol. 122, No. 16)

<> Seven giant corporations will wrestle for control of the space shuttle during the coming year.

The winner will capture a multibillion-dollar contract to service the reusable spaceship for the next 15 years, involving as many as 5,000 spaceport jobs.

Losers in the bidding war will have to scramble for smaller contracts, or find themselves edged out of the shuttle program entirely.

"It's certainly a major, major piece of business for whoever gets it," said a spokesman for Grumman Aerospace Corp., one of the prospective bidders.

Two former space center officials and a retired astronaut, Fred Haise, are deeply involved in the contract battle.

Haise, an Apollo 13 veteran who piloted the space shuttle Enterprise during approach and landing tests five years ago, is heading up a 15-man assessment team for Grumman.

Twenty-three companies asked to compete for the contract, but NASA narrowed the field to eight: United Airlines, Rockwell International, Martin Marietta Aerospace, Grumman, Boeing Services International, Lockheed Corp., General Dynamics, and United Space Boosters, a subsidiary of United Technologies.

One of the companies, General Dynamics, dropped out of the running earlier this year during a preliminary round of talks with the space agency. (THE ORLANDO SENTINEL, 5-24-82, pp. A-1 & A-4)

May 25: NASA's John F. Kennedy Space Center has awarded Ivey's Steel Erectors, Inc. of Merritt Island, a \$118,755 contract to build additional emergency exits for the Vertical Processing Facility.

Ivey's will install exterior stairs at the upper four levels of the building to be used for emergency egress from workstand levels to ground level. The stairs will be built on the west exterior of the building.

This fixed price contract will be the last week of May and the projected completion date is September 3, 1982. This is an award given to small business firms. (KSC RELEASE NO. 139-82, 5-25-82)

May 26: NASA's John F. Kennedy Space Center has awarded Speegle Construction, Inc. of Cocoa, Florida, a \$63,777 contract to increase storage space in the low bay of the Vehicle Assembly Building.

Speegle will also add supporting framework to existing storage racks. In addition to modifying the storage space, Speegle Inc. will alter the existing extinguisher piping and sprinkler system, and will install lighting fixtures beneath the decking being constructed.

The fixed price contract calls for the work to be finished by October 12, 1982. Actual construction will begin the end of July. (KSC RELEASE NO. 140-82, 5-26-82)

May 27: At 1 mph, it's not exactly the Grand Prix.

But the men who drive the space shuttle to its launch pad say the trip can be hell on wheels. Turns are wicked, quick stops are impossible and the responsibility is awesome.

"It's caused a lot of people some misery," said lead driver Dick Beck, 44, who drove his fourth shuttle to the launch pad Wednesday /May 26th/.

"At 1 mph, most people figure nothing could ever happen, but it does. If you go off the road, that's the end of the program. Some guys can't take that kind of pressure."

It was still dark when Beck climbed into the cab of the crawler Wednesday to start the twin 2,750-horsepower engines that propel the 12 million-pound vehicle.

As usual, he stowed his lunch of ham sandwiches and soda pop. And, as usual, he put the tank-like machine in gear and set out for the pad.

The 3 1/2-mile trip ususally lasts eight hours. The crawler clanks along like a moving city. Beck thinks of it as a ship or a submarine.

"It takes about 10 of us to run it, not just me."

Beck and another driver, Lester Fansler, take turns at the helm, usually working one-hour shifts. They drive standing up, like captains at the helm of a ship.

The size of the crawler takes some getting used to. Each shoe of the crawler tread weighs 1 ton. There are 57 shoes per belt, and four sets of belts.

The launch platform it carries is the size of a major-league baseball diamond.

To prevent the shuttle from toppling, 16 hydraulic jacks constantly tilt the launch platform, keeping it up right. The jacks are controlled by mercury gauges, one in each corner of the crawler. If a stiff breeze is blowing, the launch platform is hydraulically angled to compensate for the wind.

There are two turns along the route to the pad. They look gentle enough, but to hear Beck describe them they pack all the dread and menace of a roller coaster ride.

He maneuvers the crawler with a stick control, not a wheel. The momentum of the vehicle is so colossal that Beck starts easing into the turn long before he comes to a bend in the road.

Even the straightaways require total concentration. Beck relies on a crew of spotters on the ground to keep the crawler on course.

"If you look away for one second the guys on the ground are yelling at you," Beck said. "As soon as you think you got it under control, you better watch out."

The hardest part, Beck said, is maneuvering the shuttle out of the vehicle assembly building, and navigating the final few inches up the launch ramp. The shuttle has to be positioned within 2 inches of a central point and it takes two drivers, one at each end of the crawler, to accomplish the feat.

During critical maneuvers, Beck slows the crawler to one-tenth of a mile an hour. Once on the pad, the launch platform is lowered onto six pedestals and the crawler is backed down the pad again.

There are two crawlers at Kennedy Space Center. Both of them are 17 years old, and each has about 600 miles on the odometer. The gas mileage is nothing to brag about: 180 gallons to the mile.

Beck made his first ride down the crawlerway when the Saturn V rocket was hauled to the pad for the Apollo-Soyuz mission in 1975.

"I was the new guy on the block then and I only drove a little bit," said Beck.

In 17 years, the crawler crews, sometimes called the creepy crawlers, have never been late for a rollout. The crawler has never broken down in transit to the pad.

"There's a little pride in this," said Beck, who drives a '69 Camaro in his off-hours. "It's just like a ball game. You get up for it." (THE ORLANDO SENTINEL, 5-27-82, pp. C-1 & C-9)

<> The Space Shuttle, supported on a massive tractor, arrived at its launch pad Wednesday /May 26/ afternoon before a soaking rainstorm and lightning swept through Brevard County.

The Shuttle's 3 1/2-mile journey from the Vehicle Assembly Building to the pad began almost an hour ahead of schedule under partly cloudy skies, at 7:09 a.m., when it seemed inclement weather was headed for Kennedy Space Center later in the day.

By 1:09 p.m. the spaceship with its booster rockets and peach-colored fuel tank attached was at pad 39A "under the lightning rod," said Roy Tharpe, a chief engineer with the Shuttle rollout team. By 4:32 p.m. the Shuttle was fully secured to the pad.

Tharpe said that with the smooth rollout of the Shuttle to the pad, the biggest hurdle remaining before the June 27 launch is the mock countdown Saturday. Astronauts Thomas Mattingly and Henry Hartsfield will go through the motions of launch day with a largely computerized countdown inside the Columbia cockpit.

By June 5, the Defense Department's secret cargo will be rolled into the Columbia's open cargo bay out of a fully enclosed room inside a steel structure next to the now-upright Shuttle.

The package of military instruments, packed in a canister, was hoisted by crane to the ultra-secure and contaminant-free room Saturday.

Technicians still have to install the last five of Columbia's 1,050 heat protection tiles that had to be removed, strengthened and reglued to the spaceship's aluminum skin following the last mission. (TODAY, 5-27-82, p. 16A)

May 28: A group of McDonnell Douglas Technical Services Co. employees have received an Aerospace Awareness Panel Team Award for their work in verification of the OSTA-1 software interface.

The team members are Mary Rhinefield, Pete Ward, Chris Camerino, Jim Kidd, Gerry Mook, Herb Wilson, Don Chappell, Chuck White, John Newsome and Bob Fine.

This MDTSCO team was assigned to design and develop a test to verify that the OSTA-1 payload interface was compatible with the Columbia. The stumbling blocks in this project included the fact that OSTA-1 was the first shuttle cargo, the development schedule was cut by three months, and they were using test equipment for the first time.

The team was cited for providing a timely response to changing requirements, and for "individual dedication, personal time sacrifice and unselfish devotion" in successfully completing the OSTA-1 interface test on schedule. (SPACEPORT NEWS, 5-28-82, p. 2, Vol. 21, No. 11)

<> Miss Baker, one of the first two animals recovered alive from an American space flight, celebrated her birthday and the 23rd anniversary of her historic journey Friday /May 28/, literally a museum piece but still adored by the nation's children.

Miss Baker, at 25, the oldest squirrel monkey in captivity, gets an average of 100 letters a day at the Alabama Space and Rocket Museum, where she lives in a plexiglass home amid space-age exhibits and replicas of flying machines.

"Sometimes they address their letters to 'Miss Baker, Space' and they find their way here," said Lee Sentell, a spokesman for the space center. (TODAY, 5-29-82, p. 5A)

May 29: It took two tries, but the space shuttle Columbia finally performed right on cue Saturday /May 29/ during a major dress rehearsal for its June 27 launch.

The mock countdown had to be scrubbed once when computer problems flared up 31 seconds before launch. The problem was fixed, however, and astronauts Thomas Mattingly and Henry Hartsfield took the controls a second time to complete the test.

If it had been a real countdown, the launch would have been postponed for another day, Mattingly said, since the final countdown was not completed until 3:20 p.m.

Three main problems cropped up during Saturday's countdown, stopping the count four times. One involved the shuttle's hydraulic system, which had been deliberately turned off.

"The computers hadn't been told it was off," said NASA spokesman Hugh Harris. "They kept looking for hydraulic pressure and there was none."

Another problem developed when the radio and tracking station on Merritt Island temporarily lost touch with the Columbia.

But the most serious malfunction came 31 seconds before launch, when computers gave conflicting commands to the vents that equalize pressure inside the shuttle's cargo bay during launch.

The vents were simultaneously ordered to open and close, sending a power surge through the Columbia's on-board electrical system that tripped several circuit breakers.

As a result, the astronauts crawled out of the shuttle cockpit and doffed their flight suits. After eating lunch and attending briefings, they returned for a second try.

"The second attempt went without a glitch," one space official said. (THE ORLANDO SENTINEL, 5-30-82, pp. A-1 & A-14)

JUNE 1982

June 1: Space technicians Tuesday /June 1/ prepared the shuttle Columbia for its next major test -- today's loading of supercold fuel into the orbiter's external tank.

A space agency spokeswoman said loading of 1.6 million pounds of supercold liquid hydrogen and oxygen fuel was scheduled to begin about 8 a.m.

Hydrogen, at 423 degrees below zero, and oxygen, at 297 below, are the primary propellants for the shuttle's three main engines. It should take about 90 minutes to fill the tank with liquid hydrogen and some three hours to load the liquid oxygen.

The test will also involve a mock countdown, leading to a simulated blastoff, set for 2 p.m. When the test is completed, the propellants will be drained out of the tank.

The propellants will be reloaded into the tank about five hours before the shuttle's fourth and final test flight, a 7-day mission scheduled to begin at 11 a.m. June 27. (THE ORLANDO SENTINEL, 6-2-82, p. B-2)

June 5: Ivey's Steel Erector's Inc. of Merritt Island was awarded a \$118,755 contract by NASA to erect additional emergency exits for the vertical processing facility at the Kennedy Space Center.

Also, NASA has awarded Watson Paving Inc. of Cocoa Beach a \$348,568 contract to resurface the northbound lanes of Kennedy Parkway and SR3. (TODAY, 6-5-82, p. 14C)

<> Top-secret Department of Defense cargo was loaded Saturday /June 5/ into the Space Shuttle for use on its fourth mission in space, officials said.

The installation at the launch site was conducted by Air Force personnel and employees of defense contractors who had security clearance.

"I can confirm that the payload was installed, but I don't know anything else," said NASA spokesman Dick Young. The Air Force also refused comment.

NASA and the Air Force would conduct tests between the Orbiter and the military payload before the June 27 launch, Young said. Those are computer tests to make sure the electrical connections between the Shuttle and cargo are functioning.

The Pentagon has refused comment on the mysterious payload except to say that it would not be placed in orbit and would return to Earth with Columbia. Speculation at Kennedy Space Center is that the cargo contains infra-red sensors to conduct night photography from high altitudes. (TODAY, 6-6-82, p. 18A)

June 7: Technicians late last week were inspecting turbine bearing housing seals on two of the space shuttle's main engine fuel pumps following successful test loading of cryogenic propellants in the external tank.

Decision to inspect the seals on the No. 1 and No. 3 engine fuel pumps was made by National Aeronautics and Space Administration after it was discovered that the No. 2 engine fuel pump seal was cracked. Officials do not believe this activity will impact the launch, which is scheduled for 11 a.m. EDT June 27. Extra time was needed for leak checks after the inspections.

The space shuttle vehicle system has been at Launch Pad 39A since May 26, when it was rolled out of the Vehicle Assembly Building. In addition to the external tank loading test on June 2, demultiplexer setup caused orbiter vent doors to be given conflicting commands during this demonstration, and the computer aborted the test on the first try. It was successful on the second attempt.

Alfred D. O'Hara, director of shuttle processing, said the Orbiter Columbia weighs 172,076 pounds compared with a predicted 172,234 pounds. He said the countdown preparation cycle will begin June 15 and the launch countdown will be under way June 23.

Meanwhile, the 57 European Space Agency experiments that will be flown in the first Spacelab arrived here late last month on a Lufthansa Boeing 747. They were shipped from the Erno facilities in Bremen. Spacelab 1 will be the payload on board the ninth shuttle mission, scheduled September 30, 1983.

The European experiments involve 24 instruments that will obtain data in the disciplines of atmospheric physics and Earth observations, astronomy and solar physics, plasma physics, life sciences and material sciences. NASA will have 12 instruments on Spacelab 1. (AVIATION WEEK & SPACE TECHNOLOGY, 6-7-82, p. 21, Vol. 116, No. 23)

June 8: Despite fears of a menacing wind out of the north, Western Union's fifth in a series of communications satellites was launched minutes after sunset Tuesday.

Meteorologists at the Cape Canaveral Air Force Station launch site were concerned early in the evening that the 28 mph wind at 18,000 feet would interfere with steering of the Delta rocket that carried the satellite into space.

A weather balloon sent up about 20 minutes before liftoff found the winds had died down, and NASA engineers gave the signal for a fiery rocket ignition at 8:24 p.m.

Against the backdrop of calm skies streaked red with the colors of sunset, the 116-foot-tall rocket lofted into the atmosphere at a speed of more than 10,000 mph.

Within two minutes all nine of the rockets solid-fuel booster rockets had spent their fire power and were jettisoned into the Atlantic Ocean from as high as 30 miles up.

Western Union's \$30 million satellite, WESTAR V, is designed to provide Muzak to subscribers, color television channels and to transmit computer-coded pages of the Wall Street Journal from its Massachusetts plant to printing presses in Orlando.

With WESTAR V, Western Union is the first company to have five communications satellite operating in Earth orbit.

The 1,280-pound satellite is equipped with 24 transmitter/receivers, and all are booked by companies renting the satellite's services. Western Union earns about \$75 million a year from satellite services, said Warren Bechtel, a company spokesman.

One of WESTAR V's customers is Citicorp, the first financial institution to own space on a satellite. With two of the transmitter/receivers Citicorp will handle by satellite the bulk of its conferences and data transmissions between offices across the country.

Once operational in August, WESTAR V will circle the Earth 22,000 miles above the Galapagos Islands in the Pacific.
(TODAY, 6-9-82, p. 16A)

June 10: Seventeen days before its fourth launch, workers at Kennedy Space Center spent a second full day Wednesday piping highly combustible propellants into the Space Shuttle Columbia's supplementary fuel tanks.

The area was cleared of all workers except those in protective clothing who were involved in the fueling operation, which began Tuesday afternoon and concludes Saturday.

"These are crucial tasks necessary to get the thing ready for launch on the 27th," said Ken Senstad.

"It's going very smoothly and they're on schedule," said the NASA spokesman.

Columbia's main fuel supply, stored in its oversized throwaway fuel tank, won't be put in until hours before liftoff. Columbia's fourth and final test flight aloft is scheduled to begin June 27 at 11 a.m.

Wednesday's operations focused on caring for the tanks which fuel the Shuttle's orbital maneuvering system and reaction-control system engines -- the engines which operate while Columbia is in space. The engines burn a highly combustible mixture of hydrazine and nitrogen tetroxide.

The propellants are stored in separate areas at the corners of the launch pad and are fed by transfer lines into tanks located on the Shuttle.

Measures have been taken to prevent a repetition of a spill of nitrogen tetroxide last September which delayed the Shuttle's second mission about a month. The chemical loosened bonding material and 379 heat protective tiles around the spacecraft's nose had to be replaced. (TODAY, 6-10-82, p. 16A)

June 11: A senior flight test engineer for General Dynamics, Convair Division, 's wearing a big smile these days along with honors presented with the corporation's Extraordinary Achievement Award.

F.O. "Red" Hagerman actually started smiling last February, when the reason for the award occurred, and the veteran space worker saved the launch of INTELSAT 5-D from potential disaster.

During preparation for the terminal countdown demonstration of the Centaur Propulsion test at Atlas-Centaur Complex 36, Hagerman detected an abnormal sound above the competing "racket" of gas venting during the 2.5-second valve cycling exercise.

Hagerman was able to isolate the sound to the area of the Centaur main engine, and the valve cycling operation was stopped and rechecked to allow the problem to be secured.

The noise turned out to be coming from a stress corrosion crack in the liquid oxygen pump inlet valve. Pressurized helium gas utilized to open and close the vitally important valve was leaking from the crack.

The crack was repaired and a potential multi-million dollar loss was avoided when the valve functioned satisfactorily during the subsequent launch of the INTELSAT 5-D spacecraft atop Atlas-Centaur Number 58.

Supervisor Sy Baker credited Hagerman's long years of experience with the timely detection of the problem. The engineer has been with GDC since 1958, working his way

through night school to attain a bachelor's degree in Mechanical Engineering in 1975. (SPACEPORT NEWS, 6-11-82, p. 2, Vol. 21, No. 12)

June 12: NASA's John F. Kennedy Visitors Center had 95,232 visitors last month, the second busiest May in the center's 16-year history.

The previous record, of 114,987 visitors, was in May 1981.

Attendance for the year is down 2.8 percent so far, to 672,999 from 692,889 a year ago. For all of last year, 2 million visitors passed through the center. (TODAY, 6-12-82)

June 13: An ambitious, privately owned company developing its own space-for-profit transportation system is talking with top space agency officials about leasing a launch pad at Cape Canaveral.

Space Services, Inc., based in Houston, has received a positive reaction from NASA on a proposal to lease Launch Complex 36 to fire unmanned spacecraft into high Earth orbits, a company spokesman said.

Representatives of the firm, including former Kennedy Space Center Director Lee Scherer, have conferred with present KSC Director Dick Smith and NASA Administrator Jim Beggs on the plan.

"We've run into no opposition and we're putting together a written proposal now," said Walt Pennino, SSI public relations representative in Washington.

"The time is approaching for the commercialization of space and this is one of a number of proposals NASA is considering," said Scherer, a consultant with SSI and vice president of an energy firm located in the city of Cape Canaveral.

"Beggs has said the time has come," Scherer added, "It's probably time to turn expendable (launch) vehicles to a commercial company so that NASA can concentrate on the Shuttle."

SSI's test launch of a liquid-fueled rocket at its site on Matagorda Island, off the Texas coast, ended in failure last August. It is trying again with a solid-fuel rocket in September.

But its operations from the Cape Canaveral site would involve Atlas Centaur rockets, carrying commercial satellite payloads on a fee basis.

Pennino said General Dynamics which makes the powerful Atlas Centaurs for NASA's use, is willing to sell to SSI if the leasing agreement is reached.

There is concern among many officials involved in the space program that unless the U.S. government soon begins to work closely with private industry, much of the business not handled by the Space Shuttle in the future will go to an aggressive European consortium.

The French-made Ariane rocket already is taking business away from NASA's expendable rocket program.

The largest American communications company, Western Union, recently announced it is buying an Ariane to launch its sixth satellite next year because it is \$7 million cheaper than the cost of using a Delta rocket from Cape Canaveral.

Western Union also said it would receive "more attractive financing" from French and West German banks.

The potential profits in space -- to be made in fields ranging from communications satellites to manufacturing -- are talked of in many billions of dollars.

"The Reagan administration is studying this (commercial-government tie-in) closely; they are drafting the policy," Scherer said. "I hope to see some statement from President Reagan on July Fourth on this."

Reagan is scheduled to greet the returning Space Shuttle astronauts after Columbia's final test mission, ending at Edwards Air Force Base in California, on July 4. (TODAY, 6-13-82, p. 18A)

June 15: The Space Shuttle's July 4 landing at Edwards Air Force Base has been pushed to later than originally scheduled to test the craft in crosswinds, the space agency said Monday.

The landing of the Columbia at Edwards Air Force Base originally was scheduled for 7:38 a.m. Pacific Coast time, but has been rescheduled for 9:13 a.m., to increase the chances that the Shuttle will land in a crosswind, NASA said. This is a situation in which the Shuttle has not yet been tested.

The wind grows stronger at the base later in the morning.

In a tongue-in-cheek article, AVIATION WEEK & SPACE TECHNOLOGY magazine reported that the landing was rescheduled to give President Reagan, who may appear at the landing site, an extra hour of sleep. (TODAY, 6-15-82, p. 10A)

June 16: P.J. Goodwin Corp., Merritt Island, was awarded a contract as part of the \$8 million Kennedy Space Visitors Center expansion program.

The contract includes a 10,000-square-foot souvenir sales and operations building at \$510,776; and a 7,200-square-foot central receiving building at \$175,307. (TODAY, 6-16-82, p. 14C)

<> Astronaut space suits were loaded aboard Space Shuttle Columbia Tuesday /June 15/ as preparations continued for a five-day launch countdown beginning next Tuesday.

Work crews at the launch pad also installed heat-protection skirts on the bottom of the twin rockets which help propel the Shuttle into orbit. And they conducted a number of safety checks aboard the spacecraft, said spokesman Mark Hess at Kennedy Space Center.

"Nothing out of the ordinary. Everything going along pretty well, right on schedule," said Hess.

Later in the week, flight computer programs will be put aboard the Columbia as technicians run through a series of systems checks to make sure everything is in order for the start of the countdown.

The seven-day mission is set to begin on Sunday, June 27, with a touchdown expected at Edwards Air Force Base in California on July Fourth. (TODAY, 6-16-82, p. 10A)

- <> The Applied Technology Division of Computer Sciences Corporation has won an extension to its current contract to provide communications and instrumentation support services to the National Aeronautics and Space Administration.

The contract extension is valued at \$30,765,993, bringing the total value of the company's contract with NASA to \$186,132,473. Under the contract the company provides communications and instrumentation support such as operation and maintenance of the checkout, control and monitor subsystems within the Space Shuttle ground launch processing system, and provides computer operations and maintenance support for a variety of functional offices.

The cost plus award fee contract extension covers the period from June 1 through December 31, 1982, with a cost plus fixed fee option to extend until February 28, 1983. (KSC RELEASE NO. 151-82, 6-16-82)

June 17: A NASA official has turned down Brevard County Sheriff Jake Miller's request for federal assistance to pay his deputies overtime for handling huge shuttle launch crowds.

Because Miller couldn't afford to pay overtime for the last launch, he resorted to granting 1,200 hours in compensatory time.

A NASA legislative assistant, Patrick Templeton, has notified U.S. Rep. Bill Nelson that NASA thinks tourist dollars brought into Brevard by the shuttle should offset any law enforcement expenditures.

Miller's suggestion of funding the grant by raising the ticket price for tours at Kennedy Space Center also was turned down. Templeton said it would be unfair to expect people coming through the tour center to foot the bill for handling launch traffic.

Miller said he intends to pursue any other funding he can find. "While we all love the shuttle, I was hoping the federal government would realize the impact it has on the county. This is a unique situation."

In his recent budget request to the Brevard County Commission, Miller asked for a 65 percent increase. Among his reasons was managing large shuttle crowds. (THE ORLANDO SENTINEL, 6-17-82)

- <> Kennedy Space Center, saying that "it appears that there will be a need to develop additional launch vehicles to accomplish objectives beyond the capability" of the Space Shuttle, is issuing RFP's for a study of ground operations for an Advanced Space Transportation System.

KSC said the advanced STS system is to be compatible with the Space Transportation System class of payloads.

The study will take launch vehicle configurations being developed and determine the impact of each configuration will have on the launch site. The study will define any new facilities, modifications to existing facilities, impacts on ongoing STS activities, ground support equipment, ground operation activities, estimated manpower and costs associated with the processing and launch of each configuration covered by the study.

Advanced STS concepts being studied include cargo vehicles using components of the STS -- the SRB-X and the Space Shuttle Cargo Vehicle -- which are a decade away, if built. Studies also continue on advanced fully-reusable shuttles, both single and two-stage versions. (DEFENSE DAILY, 6-17-82, p. 261, Vol. 122, No. 33)

- <> NASA associate deputy administrator Philip E. Culbertson has told the House Space Subcommittee that NASA believes it needs a fifth Space Shuttle Orbiter in order to guard

against downtime or even possible loss of one of the four Orbiters now being built but he said that the Reagan Administration has not yet made a decision to buy a fifth vehicle, with its more than \$1 billion cost a major consideration. (DEFENSE DAILY, 6-17-82, p. 260, Vol. 122, No. 33)

June 18: Two veteran spacecraft now probing the far reaches of the solar system are searching for a possible new and mysterious object, but scientists said Thursday they had no idea as to what it might be.

"It's very likely there's something out there," said John Anderson, who heads the project. "The question is, what will we find? That's impossible to predict. There's a whole range of possibilities...We're keeping an open mind."

Anderson suggested several possible explanations for the object, but said it was hard to choose the most likely because each raised new problems of its own. His list included a 10th planet.

He told a news conference at NASA's Ames Research Center that a planet seems unlikely since, to avoid detection, it would have to be very dark, and it is difficult to figure out how that could happen.

"My thinking is more on it's being a star-type object of some kind," he said.

Such a star, he said, would have to be dark since it has not been seen. That raises the possibility of "a brown dwarf," a cold star too small to have ignited the nuclear reactions that power the sun.

He said it could be a permanent part of the solar system billions of miles away or "it might be a visitor, a dark star that just happens to be in the neighborhood and will be moving on" after 100,000 years or so.

If the object is still farther away, he said, it might be the corpse of a dead star that collapsed into a neutron star where matter is so dense that if the Earth were that dense it would fit into a thimble.

"Or we could go even farther out and have a black hole" -- a region of space, perhaps the graveyard of a giant star, where mass becomes so concentrated that nothing, not even light, can escape its gravitational pull. The problem with a black hole, however, is that energy is released just outside its confines as matter breaks up and falls into the invisible abyss.

In fact, Anderson said, "There are problems with all these possible explanations."

Anderson, of the Jet Propulsion Laboratory in Pasadena, is heading the new experiment by the two Pioneer spacecraft that left Earth a decade ago and are now farther from home than any working probe has ever gone. The spacecraft gave man his first close look at the planets Jupiter and Saturn and are now on opposite sides of the sun and moving away at more than 30,000 mph. (TODAY, 6-18-82, p. 14A)

June 20: The first shovelfuls of dirt will be turned at the site of an \$8 million expansion to Kennedy Space Center's visitor information center during a ceremony at noon Friday.

KSC Director Dick Smith will lead the ground breaking ceremony.

The expanded center is scheduled to open by 1983 and will include a new theater complex with a five-story, 70-foot-wide screen and a 500-seat demonstration auditorium.

Space center officials say the expansion is necessary to accommodate the projected tourism increase to the area with routine Space Shuttle flights. The renewal of manned space flights drew a record of more than 2 million people in 1981, a 26 percent increase over 1980. (TODAY, 6-20-82, p. 2B)

<> Sally K. Ride, slated to be America's first woman astronaut to blast into orbit next year aboard the Space Shuttle Challenger, said Saturday that she expects no particular difficulty in adapting to the weightless environment of space flight.

Ride, who has a doctorate in astrophysics, acknowledged that in terms of experience with women in space, "there's no data. If the Russians got any data when (Soviet cosmonaut) Valentina Tereshkova went up in 1963, they haven't let us in on it. So we really don't have any information. In that sense, everything's unknown."

"But on the other hand, there's really no reason to expect that a woman would react either better or worse than a man does. Men seem to adapt to it really very well, she told reporters.

"It appears as though there's about a one-to two-day adjustment period, where your body is just getting used to being weightless. After that, the body adapts very well."

The 31-year-old astronaut from Encino, California, is to go into space as a mission specialist aboard the seventh Shuttle flight, currently scheduled for April 20, 1983. That will be the second flight of the Shuttle Challenger. (TODAY, 6-20-82, p. 16A)

June 21: A NASA physicist predicts that man's knowledge of the heavens will take a giant step during the next 10 years when researchers are able to supplement traditional telescopes with space-based systems.

The space-based radio astronomy system, called a Very Long Baseline Interferometer, would link an orbiting radio astronomy antenna to one or more antennas on Earth. (THE ORLANDO SENTINEL, 6-21-82, p. A-6)

<> Spaceport workers are starting frantic activity to get ready for the space shuttle Columbia's scheduled blastoff this Sunday on its fourth and final test mission.

While most of the ground crew had a rare day off, a skeleton team of about 100 workers made last-minute preparations Sunday for the start of the 90-hour countdown, set to begin at 5 p.m. Tuesday.

Dick Young, a space agency spokesman, said technicians "powered up" the orbiter and solid-rocket boosters Sunday to make sure everything was installed and the connections were secure.

Technicians also worked on "power-shooting" a ground electric power supply that failed Friday. Young said the power failure delayed countdown preparations but should not interfere with the start of the countdown.

The Columbia will carry scientific instruments and a payload of secret military cargo, including an infrared radiation detector, on its final test flight commanded by Apollo 16 veteran Thomas Mattingly. The pilot will be space rookie Henry Hartsfield.

The spaceplane is scheduled to land July 4 at Edwards Air Force Base, California. (THE ORLANDO SENTINEL, 6-21-82, p. A-10)

<> The appointment of George F. Page as Deputy Director of NASA's Kennedy Space Center, Florida, effective July 5, 1982, was announced today by General James A. Abrahamson, Associate Administrator for the Space Transportation System.

Director of Shuttle Operations at Kennedy since 1979, Page won international acclaim for his leadership as launch director for the first three launches of the Space Shuttle.

Page has had a distinguished career in both manned and unmanned areas of the space program. From 1964 to 1975, Page directed Kennedy operational planning and integrated systems testing of the Gemini and Apollo spacecraft.

This series included the historic lunar landings and the extremely successful Apollo/Soyuz joint program with the Soviet Union. Page was named Director of Unmanned Launch Operations in 1975, and directed more than 54 major launches from Kennedy and the Western Test Range at Vandenberg Air Force Base, California, during the next four years.

A graduate of Penn State University with a bachelor's degree in aeronautical engineering, Page was given the Distinguished Alumni Award for 1982. He has earned numerous

other awards including two NASA Exceptional Service Medals and two Meritorious Executives in 1981 and has been nominated for the rank of Distinguished Executive this year.

Page and his wife Dorie reside in Cocoa Beach, Florida.
(NASA NEWS RELEASE NO. 82-102, 6-21-82)

<> National Aeronautics and Space Administration last week added 3 hours of clock time and 6 hours to the first hold in the shuttle Mission 4 countdown to provide added time to service the Defense Department infrared telescope.

Launch target time of 11 a.m. EDT June 27 is not affected, but the call to stations that marks the beginning of the launch countdown has been advanced to 5 p.m. June 22 from 2 a.m. the following morning. The countdown itself will last 90 hours and built-in holds will total 24 hours.

Countdown events remain the same as those developed earlier this month, except for starting the clock 3 hours earlier and making the first hold at T-40 hours last 14 hours instead of 8 hours. This will provide front-end time to service the cryogenic-helium-cooled infrared telescope. A key to a normal count will be the completion of cargo servicing 42 hours before launch.

Three time blocks will be tested during this count, two of which NASA wants to become standard for future countdowns. They are the initial phase, from T-87 hours to the first hold at T-40 hours, and the final phase from T-9 minutes when the ground launch sequencer takes over the count until launch. The middle block of time will vary according to payload and crew size. For Mission 4, the middle block lasts nearly 58 hours because of the requirement to open the payload bay doors to service the cargo and then close out the payload bay, retract ground handling mechanism, close doors and stabilize the payload bay environment with gaseous nitrogen. (AVIATION WEEK & SPACE TECHNOLOGY, 6-21-82, p. 19, Vol. 116, No. 25)

June 23: Computer Sciences Corp. (CSC), headquartered in El Segundo, California, has been awarded a \$30.8 million extension to its contract to provide support services to the National Aeronautics and Space Administration at Kennedy Space Center.

CSC designs and engineers computer-communications systems, manages clients' computer facilities, operated a world-wide remote computing service called Infonet and is a prime contractor to the NASA center. (TODAY, 6-23-82, p. 14C)

- <> Four companies have submitted proposals for a Base Operations Contract, the first of three comprehensive contracts to be awarded by NASA's Kennedy Space Center, Florida, to strengthen the Space Transportation System launch function.

The Base Operations Contract will cover institutional support services, now provided by 13 different contractors, into a single mission contract which includes utilities, facilities, and administrative services, technical services, and health and protective services.

The contract could cover a period of as many as 10 years and involve expenditures of more than \$500 million over the life of the contract.

Proposals, opened June 17, were received from:

*BENKO Joint Venture (Bendix Field Engineering, Wackenhut Services, Inc., Planning Research Corporation and Computer Sciences Corporation), Cape Canaveral, Florida.

*Boeing Services International, Cocoa Beach, Florida.

*EG&G, Wellesley, Massachusetts.

*Lockheed Engineering and Management Services Co., Inc., Houston, Texas.

The proposals are being reviewed at Kennedy and a source selection may be made by early October. It is projected the Base Operations Contract winner would begin work about mid-November.

The contractor selected would be fully responsible for management, operation, maintenance and engineering for Kennedy Space Center utilities, facilities, certain technical and administrative operations and health, fire and security services.

This is the first of three comprehensive contracts that NASA plans to establish at Kennedy as the most effective and economical method of conducting Space Shuttle missions when the system becomes operational. The other two single mission contracts will be a Shuttle Processing Contract responsible for refurbishment, assembly, checkout and launch of Space Shuttle, and a Cargo Processing Contract. (NASA RELEASE NO. 82-105, 6-23-82)

June 24: The countdown for Sunday's liftoff of the Shuttle continued problem-prone Wednesday /June 23/ while the astronauts for the fourth mission rehearsed in a flight simulator in Houston.

Kennedy Space Center workers conducted a variety of tests to ensure the Columbia's systems will operate properly during the week-long mission set to begin at 11 a.m. Sunday /June 27/.

Technicians spent the day cleansing and testing the Shuttle's three electricity-producing fuel cells, as well as loading liquid hydrogen and liquid oxygen to fuel those cells. The spacecraft's two computer memory units also were checked.

Members of the Air Force Rescue and Recovery Team practiced their rescue methods, using a mockup of Columbia. Should the Shuttle be forced to abort and land in water, the team would have the responsibility of pulling the crew from the downed spacecraft.

"We're proceeding on schedule with no problems," said KSC spokesman Mark Hess.

At 7 p.m. today the countdown will stop for 14 hours during a scheduled hold.

At Houston's Johnson Space Center, Navy Capt. Thomas Mattingly, 46, and Henry Hartsfield, 48, climbed into the Shuttle simulator to practice various aspects of the mission.

"It was their call on what they rehearsed, where they feel at this point they need to concentrate their training," said NASA spokesman John Lawrence.

Later the astronauts huddled with flight directors for a thorough review of the flight plan. They are to arrive at Patrick Air Force Base Friday afternoon. (TODAY, 6-24-82, p. 14A)

June 25: The successful launch and insertion into orbit of Western Union's Westar, making the corporation the first in America to have five communications satellites operating above the Earth.

The fifth in a series of domestic communications spacecraft owned and operated by Western Union, Westar roared away from Launch Complex 17, Cape Canaveral Air Force Station, atop a two-stage Delta vehicle at 8:24 p.m. on June 8.

Routine tests indicated performance has been "picture perfect," spokesmen for the corporation said, and communications testing was initiated on June 18. Service is expected to begin on about July 20. (SPACEPORT NEWS, 6-25-82, p. 1, Vol. 21, No. 13)

<> Mike Hunter, electrical engineer for the external tank, is the first recipient of Martin Marietta's newly initiated Employee of the Month Award.

Following STS-3 launch uncertainties regarding dynamic loading of the external tank's liquid oxygen aft dome, several additional measurements for the STS-4 tank were required.

Hunter was given the responsibility of coordinating and implementing all Michoud Assembly Facility requirements, to be accomplished prior to testing to avoid impacting testing and launch schedules.

His dedication and perseverance were credited with accomplishment of the task without either impact to schedules or significant overtime.

He was selected by an elected board of Manned Flight Awareness representatives. (SPACEPORT NEWS, 6-25-82, p. 7, Vol. 21, No. 13)

- <> As the Space Shuttle program moves closer to a regular and busy mission schedule, scientists and engineers at KSC are considering future sources for the millions of gallons of liquid hydrogen that will be needed for the orbiters' main engines.

Approximately half a million gallons of liquid hydrogen, mostly burned as fuel in the orbiter's three main engines, are expended during each flight of the Shuttle. More than 150,000 gallons can "boil away" during pre-launch and launch procedures. About 100,000 gallons are used each time the giant external tank is filled and emptied.

Whether the needed hydrogen will continue to come from relatively distant sources -- or from a manufacturing plant at or near the center -- are questions being examined by the KSC teams.

Currently, the liquid hydrogen, which must be kept at -423 degrees Fahrenheit, is produced from natural gas at a Louisiana plant for 62 cents per gallon and shipped in insulated 13,000-gallon truck tankers. Beginning next spring, the super-cold substance will also be shipped in specially designed rail cars holding 34,000 gallons each.

Estimated use of liquid hydrogen at KSC this year totals approximately 2,000,000 gallons. By 1990, however, speculates James Spears, chief of the KSC special projects development office, 15 million gallons might be needed for all uses. By the year 2000, he added, the use conceivably could climb to 50 million gallons.

The KSC teams are studying production of liquid hydrogen from both fossil and non-fossil sources.

A polygeneration plant, for example, could use a coal gasification unit to begin a process that would produce hydrogen, heat for steam, oxygen and nitrogen gases, sulphur and energy for production of electricity. Even the slag waste product might be useful as a building material.

Possible non-fossil sources for hydrogen include a type of blue-green algae which produces hydrogen rather than oxygen as it grows in sea water. Certain bacteria that give off hydrogen as they metabolize sugar offer another potential source.

Spears said the ideal hydrogen production facility, though not now economically workable, would be a solar-powered plant to split sea water into hydrogen and oxygen through electrolysis. The plume of steam from the combustion of hydrogen and oxygen in the Space Shuttle's engines would return to the sea to complete the cycle.

Such a process was envisioned by author Jules Verne when he had Cyrus Harding, a character in "The Mysterious Island," predict that one day water would be used as fuel, split into hydrogen and oxygen to furnish an inexhaustible source of heat and light. (SPACEPORT NEWS, 6-25-82, p. 2, Vol. 21, No. 13)

<> All Carol Burnett had to do was say so.

As soon as NASA officials heard the comedienne was interested in space travel, they invited her to Sunday's launch of the Space Shuttle Columbia.

On a Barbara Walters' special recently, Burnett mentioned she would love to have been an astronaut (if she hadn't been a star). Before she knew it, NASA officials were on the phone inviting her to be a guest at Columbia's lift-off.

Carol, who played the gin-guzzling orphanage head-mistress in "Annie," had already made plans to attend the London premiere of the movie this week. Now she's planning to return home to California via Florida, to cheer on the Columbia.

Burnett is one of 3,500 VIPs expected to attend the fourth launch of the Shuttle, according to NASA officials.

Other celebrities who have accepted launch invitations include musical stars Eric Clapton and Jimmy Buffett.

Guitarist Eric Clapton, who is known for his hits "Layla" and "Lay Down Sally," has played everything from rock to reggae. He was part of the British invasion of the mid-60s playing in such super groups as Cream and Blind Faith.

Buffett, a Floridian whose favorite cause is the manatee, attended the last two launches. The singer/songwriter's hit "Margaritaville" gained him national attention in 1978 and he's followed that up with several successful albums.

NASA officials are delighted that the commanders of the Shuttle missions, 1, 2 and 3 -- John Young, Joe Engle and Jack Lousma -- will also watch STS-4 from the VIP site.

Other astronauts expected to attend are: Jerry Carr, James Lovell, Eugene Cernan, James Irwin, Donn Eisele, Charles "Pete" Conrad, Jr., Edwin "Buzz" Aldrin, Jr., Fred Hayes, Ron Evans, Stuart Roosa, Edgar Mitchell and Fred Haise.

Numerous foreign dignitaries from as far away as Australia and Iceland and representatives from the United Nations are planning to attend the launch.

At least 24 members of Congress and six U.S. senators are expected to be here. They include Congressman Bill Nelson, D-Melbourne; Congressman Don Fuqua, D-Fla., chairman of the U.S. House of Representatives' Science and Technology Committee; and Congressman Ron Flippo, D-Ala., chairman of the House Subcommittee on Space and Science Applications.

Although there is no long list of Hollywood stars invited to the launches, if a celebrity expresses an interest in the space program, he or she may receive an invitation, according to NASA officials.

Previous launches have attracted such big names as actors Robert Redford and Michael York, singer/actor John Denver and entertainer Orson Bean.

Amy Carter, daughter of former President Jimmy Carter; John J. Louis, Jr., the U.S. Ambassador to Great Britain; Ed Meese, counselor to President Reagan; and former senator George McGovern attended the last launch.

NASA officials at the Kennedy Space Center make recommendations to the NASA on who should be invited to the launch to the NASA Washington, D. C., office, where the final invitation list is made.

VIPs receive their invitations six weeks before the launch and are asked to RSVP at least two weeks before the launch date. (TODAY, 6-25-82, p. 1D)

June 27: Al O'Hara was just a year out of college when he started toying with rockets.

Now he gets to play with the world's most elaborate toy when he takes over as space shuttle director.

It is a job that the 50-year-old Miami native has trained for since 1979, sitting at the right hand of former launch director George Page, who was just named deputy director of Florida's spaceport.

Rocketry was a bit of an accident for O'Hara, an unexpected twist the Army provided in 1955 when they sent him to train at the Rocket and Guided Missile Agency in Huntsville, Alabama.

In four years, O'Hara became director of advanced programs at Huntsville's Army Missile Command, a post he held until 1963 when he joined NASA.

With a bachelor's degree in electrical engineering from the University of Miami and a master's degree in education administration from Stetson University, he has participated in the Apollo, Skylab and Apollo-Soyuz launches.

A former chief of site management for NASA's shuttle operations division, he has been director of space transportation system processing for the past four years.

It is a long title that means he has been the second in command for shuttle launches.

As No. 4 prepares for liftoff, there are few worries.

"We've got a great bunch of people, you've got to have confidence in the whole team. The weather looks good.

"We have confidence in the system. The thermal protection system, we have found, is quite forgiving. We can lose a few tiles and still be okay. We also have learned how to turn the thing around much more quickly.

"In our business we're conservative; we have to be. But it's making money when it's in orbit, not when it's on the ground."

Like many NASA officials, O'Hara spends a lot of time thinking about the future.

"This is the end of the test program. The next big milestone is creation of a space station. We have to continue exploring, moving ahead. Pushing technology to the ultimate is what our country's been known for all along."

O'Hara won NASA's exceptional service medal in 1969 and its outstanding leadership award last year. He, his wife, Patricia, and their four children live on Merritt Island. (THE ORLANDO SENTINEL, 6-27-82, p. A-11)

<> A severe thunderstorm soaked the space shuttle Columbia and peppered it with hail Saturday on the eve of its final test flight, damaging some of the ship's heat-resistant tiles.

Officials decided to move a service tower near the shuttle to get a closer look at the extent of the damage to tiles on the ship's rudder and body flaps. They hoped the "dimplelike" spots could be ignored or repaired by the time of today's launch scheduled.

The storm marred what had been the smoothest countdown of any shuttle flight to date.

As of 8 p.m. Saturday, officials were optimistic that the scheduled 11 a.m. liftoff would take place even if some tile repair was necessary during the night.

The inspection for storm damage late Saturday took place during a planned 8-hour hold and did not affect the countdown.

Lightning struck the service tower during the mid-afternoon storm and alarms were triggered on the pad area. (THE ORLANDO SENTINEL, 6-27-82, pp. A-1 & A-10)

<> Neither rain nor hail kept the Shuttle Columbia from riding herd on a corkscrew of flame and smoke as it bolted from its Kennedy Space Center launch pad almost a thousandth of a second shy of 11 a.m. Sunday.

The fourth and final test flight of the Space Shuttle was the first to lift off without a single failure in the \$10 billion machinery. And astronauts Thomas "Ken" Mattingly and Henry Hartsfield were the first to launch early -- 135 milliseconds early at 10:59:59.8647 a.m. said Alfred O'Hara, Shuttle launch director.

The only casualties in the mission so far are the Shuttle's twin booster rockets. The rockets, which give the Shuttle its initial kick with 48 million horsepower of thrust, sunk 3,500 feet to the bottom of the Atlantic about 160 miles directly east of the space center.

The morning Shuttle countdown was an engineer's dream, despite some evening hail and rain Saturday that put as many as 400 dings in the Columbia's fragile heat protection tiles. They were repaired by 12:30 a.m. Sunday during a built-in hold without any loss in the countdown.

With unprecedented clockwork, the countdown proceeded on schedule with full cooperation of a state-of-the-art technology that finally had been tamed. Each of the previous Shuttle launches was begun late, after mechanical failures caused delays.

An elevator which carries inspection crews to the top of the Shuttle's fuel tank shut down briefly after dawn, but was repaired in minutes.

O'Hara said in a post-launch press briefing the Columbia might be maneuvered belly to the sun so any water collected between the tiles from Saturday's rainstorm could evaporate.

He said fixing the tiles, mostly on the right Columbia wing and rear, was accomplished by brushing on an alcohol and bonding agent mix. And he said the Columbia probably would have flown without the repair work.

"We had the option to fix it before the launch and we did," he said. (TODAY, 6-28-82, p. 1A)

June 28: Comedienne Carol Burnett, who said she would like to be an astronaut, watched Columbia's blastoff Sunday from the press section rather than the VIP site because it was closer to the launch pad.

"The first thing I remember reading was FLASH GORDON," she said. "I've always been interested in the space program and space travel."

Wearing a red camisole with an American flag pin, an outfit she called appropriate for the occasion, Burnett watched the launch with her daughter, Jody Hamilton.

"What else can I say? It was a perfect launch," she said.

U.S. Rep. Bill McCollum, an Altamonte Springs Republican, was on hand for the first scheduled shuttle launch but never saw it fly because the mission was aborted. This time he wasn't disappointed.

"I'm a great believer in the space program so I'm very happy to be here," he said, taking a break from a cheese Danish.

He enjoyed the launch with his wife, Ingrid, and three sons, Douglas, 9, Justin, 7, and Andrew, 16 months. McCollum said he wouldn't turn down a ride in the shuttle if offered.

"I suppose I would if I were invited. They're not inviting congressmen these days. Maybe my boys can go up. They sure want to." (THE ORLANDO SENTINEL, 6-28-82)

<> It was, as launch director Al O'Hara put it, "very close to perfect."

And NASA officials credit their success to a variety of calculated changes developed during the past three test launches. And on the intangible quality NASA likes to call "the learning curve."

Every hour the shuttle is in the air, NASA is learning, and re-evaluating its methods.

Gradual procedural changes have been made to solve the two most troublesome elements of earlier launches: the finicky auxiliary power units and the complex liaison between computers on the shuttle and the back-up computers at Kennedy Space Center and Houston's Johnson Space Center.

Non-essential holds in the countdown have been scrubbed. Some of the systems tests have been streamlined.

The three units that supply hydraulic power for the rudder, speed brake, flaps and landing gear operate during liftoff and landing and are shut down during orbit.

During each previous launch, at least one of the units had to be shut down during liftoff because of clogged oil screens or a sudden freeze-up of the cooling unit that sprays a tiny mist of water against the power unit.

For the fourth launch, a smaller water nozzle was installed. That meant less cool water, and less chance of freezing.

To ease its computer headaches, NASA took another look at the intricate ground-launch sequencer, the tool that ties together each of the redundant computer banks on the ground and in orbit.

That linkage allows full control of the shuttle even if several computers malfunction.

The two-day delay during the first launch was partially the result of a glitch in the sequencer, forcing what NASA calls a "recycling" to double-check all the data.

Each recycling meant more delays, often forcing holds in the launch countdown.

The problem: The computers had been set to automatically recycle, double-check, even halt a systems test or a preflight operation if any discrepancy appeared.

NASA officials now say some of those early delays were the result of simply being too careful.

"In the beginning, we were concerned with our limits being very, very tight," O'Hara said.

"We've got a lot of redundant systems. We started asking ourselves, 'Do you test them every time?' Just how much testing do you do?"

He likened it to buying a spare battery, or a spare generator for an automobile. Would it be necessary to check that backup equipment daily, considering how often it might be needed?

So the computers have been reprogrammed. When two numbers don't precisely match, the computers alert a technician, without necessarily beginning a recycling or a time-consuming series of new tests.

"A lot of these things, we were realizing the man can monitor it on his CRT (computer screen) without it being automatically programmed," O'Hara said.

And then there's the cumulative effect of experience.

"America has a right to be very proud. We have good hardware, good controls. Most of the men and women here have been through the Apollo program, this program.

"You just learn the system."

Public information chief Hugh Harris, a seven-year veteran at Kennedy Space Center and a 20-year NASA spokesman, put it this way:

"The confidence level goes up every launch. It's more relaxed. They know they can do it now. They can handle the problems as they come up.

"It's crisper, more precise."

And while launching on time isn't NASA's big priority, Sunday's launch did put to rest concerns that Columbia simply is too complex a vehicle to operate without some problems.

After hailstorms, lightning strikes, heavy rain and midnight repairs, the shuttle lifted off the pad at 10:59.865 a.m.

That's 135 milliseconds early. (THE ORLANDO SENTINEL, 6-28-82, p. A-18)

<> Even the fourth time around, the launch of the space shuttle Columbia wasn't old news.

Sunday's liftoff didn't attract the throngs of reporters and television anchor stars who flocked to the Kennedy Space Center in the first three times, but Columbia's thundering blastoff still was a hot story.

While some of the novelty of shuttle flight coverage has worn off for reporters, editors and producers of the nation's news operations, most of those surveyed said the shuttle story is still far from routine.

"We're not bored yet, I assure you," said Tom Farrell, a science editor with the NEW YORK TIMES.

Still, most news organizations are scaling back their coverage.

NASA officials said there were 1,576 reporters accredited for Sunday's launch, 700 fewer than at the third launch in March. More than 4,000 reporters attended the first launch of the shuttle in April 1981.

About 20 reporters from foreign countries, including Italy and Japan, covered the launch.

All three major networks covered the liftoff live, but devoted less time to it than during previous launches. NBC gave it 1 1/2 hours, ABC one hour and CBS 20 minutes.

NBC's Tom Brokaw was the only network anchorman to report live from the Kennedy Space Center.

Producer Don Brown of NBC said Brokaw has "a sincere interest in space. We like to put our best foot forward." He said public interest continues to be strong. "It's the only good news in town," he said.

CBS producer Mark Kramer, explaining why his network devoted only 20 minutes to the launch, said that by coming on the air at 10:56 a.m., "We still caught the drama and the single most important moment."

News weeklies such as TIME and NEWSWEEK won't have much on the launch in this week's editions because the takeoff took place Sunday, one full day after their usual deadlines.

"The timing is lousy for us," said NEWSWEEK Managing Editor Kenneth Auchincloss.

Beyond the spectacle of the shuttle launch and the allure of space flight in general, coverage of the Columbia's fourth mission focused on the military payload and the fact that it was the last of four shuttle "test flights."

United Press International's space writer, Al Rossiter, Jr., said his organization's reporting staff was reduced by one from the last mission. But, he said, the fact that some other news organizations aren't sending their own reporters to cover the launch means that more of them will be depending on wire services.

Editors say they provide the coverage because they believe the public is still interested in the shuttle program. But eventually, they predict, the shuttle won't merit any more attention than the one or two paragraphs given to the frequent launchings of unmanned satellites. (THE ORLANDO SENTINEL, 6-28-82)

<> When will the shuttle land at Kennedy Space Center?

NASA still doesn't know, but the best guess is for an April 1983 landing in Florida.

Launch director Al O'Hara said the shuttle's return from its fourth and final practice mission probably will not provide the crosswind landing experience NASA had hoped to have before trying a touchdown on the three-mile KSC landing strip. The landing is scheduled for Edwards Air Force Base in California.

That means the fifth mission, set for Nov. 11, won't end in Florida either. The sixth is the first launch of the second shuttle craft, Challenger, set for Jan. 20, 1983.

NASA wants to try Challenger out at the huge Edwards salt beds before limiting its landing area.

So the seventh flight, Challenger's second, is the earliest hope for a launch and landing at KSC, O'Hara said. It is set for April 20, 1983. (THE ORLANDO SENTINEL, 6-28-82, p. A-16)

June 29: Columbia sailed through space with only minor problems Monday, but its reusable rocket boosters remained at the bottom of the sea.

Space officials blamed faulty parachutes for the loss of the \$36 million rocket casings. Two booster recovery ships returned to port Monday. Salvaging the casings seemed unlikely. However, the ships left markers above the spot where the boosters sank in 3500 feet of water, 150 miles off the Florida coast.

In an announcement late Monday, NASA said the "decelerator system malfunctioned " causing the boosters to sink.

It was not clear, however, whether the parachutes were shredded or failed to open fully. The boosters dropped right on target, leaving some officials to believe the parachutes must have opened at least partway.

The rocket boosters are designed to hit the water at about 60 mph. Each booster is attached to three parachutes, spanning 115 feet in diameter each. They are each built to withstand a load of 180,000 pounds.

The nose cones of the two rockets, which splashed down separately, were recovered as planned. Several other chunks of hardware, which broke free from the boosters after impact, were also recovered. (THE ORLANDO SENTINEL, 6-29-82, p. A-1)

June 30: Thomas E. Utsman has been appointed director of Shuttle operations to succeed George Page on July 5.

Page was named Kennedy Space Center deputy director earlier this month.

Utsman, who now serves as director of technical support, will oversee all planning, managing and technical direction of Space Shuttle operations. He began work at Kennedy Space Center in 1963 and lives in Cocoa Beach.

A native of Detroit, the 45-year-old Utsman earned a degree in mechanical engineering from the University of Michigan in 1958 and a masters degree in management from Florida State University in 1968. (TODAY, 6-30-82, p. 10A)

<> A mechanic who was injured in a March 1981 accident aboard the space shuttle that killed two co-workers has sued NASA and two Kennedy Space Center contractors.

The suit, filed Monday in U.S. District Court in Orlando by Jimmy Harper, is similar to a suit filed last week by another Rockwell International mechanic injured in the

accident. It charges that NASA, Pan American World Airways and Wackenhut Services failed to provide safe working conditions on the shuttle.

Harper, of Titusville, was one of five Rockwell employees who blacked out after breathing nitrogen gas inside a shuttle engine compartment after a countdown test. Two of the men died.

Harper and a co-worker were released from the hospital shortly after the accident, but later were called in for further observation. Harper contends he has been severely and permanently injured in his head, neck, limbs and nervous system. He is asking for an unspecified amount of damages.

Pan American is under contract to NASA to provide medical services at the space center, and Wackenhut provides fire and rescue service. Pan American Insurance Co. and Wackenhut Insurance Co. also are named as defendants in the suit. (THE ORLANDO SENTINEL, 6-30-82, p. B-2)

<> More than 178,000 people used AT&T's pay telephone number (907-410-6272) Sunday to listen in on the conversations between the crew of the Space Shuttle Columbia and ground control in Houston. (DEFENSE DAILY, 6-30-82, p. 331, Vol. 122, No. 42)

JULY 1982

July 1: Thomas Utsman, director of technical support for the Kennedy Space Center, has been named director of launch and landing operations for the Space Shuttle, succeeding George Page, who has been named deputy director of KSC. Utsman, 44, has worked at KSC since 1963, serving as associate director of design engineering and operations management and deputy director of technical support. (DEFENSE DAILY, 7-1-82, p. 7, Vol. 123, No. 1)

<> NASA's John F. Kennedy Space Center has awarded a joint venture contract to KAMAG Transporttechnik GmbH and Co. of Ulm/Donau, West Germany and Precision Fabricating and Cleaning, Inc. of Sharpes, Florida, to provide transporter units for Space Shuttle launch preparations.

The contract has a basic value of \$2,883,548 and is for the construction, testing and delivery of two self-propelled transporter systems in support of Space Shuttle operations at KSC and Vandenberg Air Force Base, California. An option for a third such transporter may also be exercised. (KSC RELEASE NO. 164-82, 7-1-82)

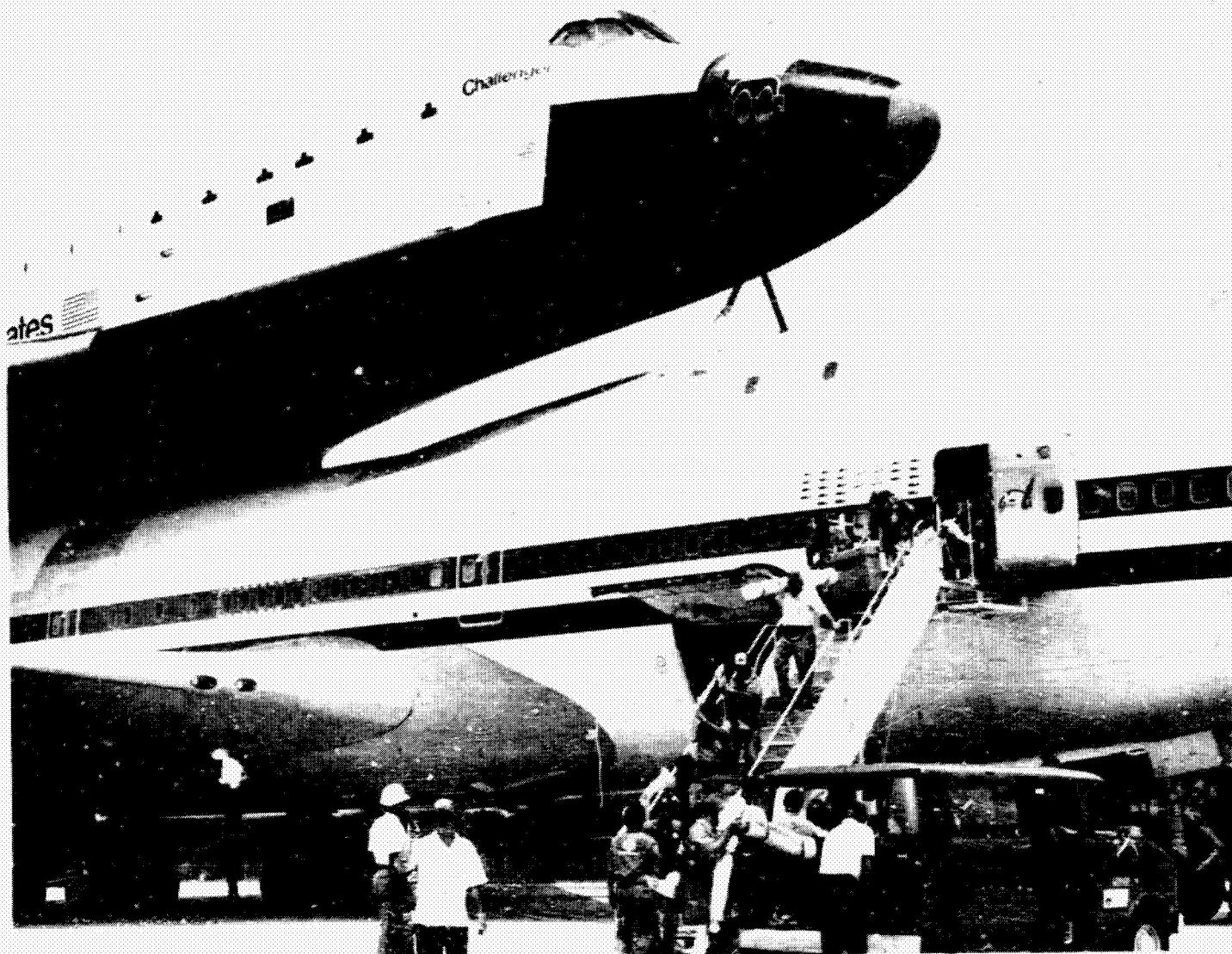
<> With a Marine Corps band playing the theme from "Star Trek," America's new, improved-model Space Shuttle was delivered to NASA Wednesday in ceremonies outside the Rockwell International assembly hangar.

Paul J. Weitz, who will command Challenger on its maiden flight next January, accepted a symbolic key to the Shuttle's hatch on behalf of "all us taxpayers who are footing the bill for this magnificent flying machine."

George Jeffs, president of Rockwell's North American Space Operations, congratulated more than 1,000 employees for meeting the delivery schedule set 2 1/2 years ago and referred to the veteran Columbia orbiting high overhead.

"That baby was built out here, too," he said.

ORIGINAL PAGE 19
OF POOR QUALITY



"Shortly after NASA's newest space-going orbiter, Challenger, arrived at KSC atop a 747 carrier aircraft, Rockwell technicians unload the special handling tools required to demate it from the 747."

"This means we now have a fleet of Space Shuttles," said Rep. William Thomas, R-Calif. "As small as it is right now, it is going to grow."

Weitz said Columbia's current flight, last of four test missions, means "basically we are getting down to the business of operating these things in space."

Challenger, mounted atop a modified jumbo jet, is to be flown next week from Edwards Air Force Base to Kennedy Space Center where NASA will add its big engines and ready it for space flight.

Though it looks identical to Columbia, this new Shuttle is a bit different. Rockwell says the most important change is that Challenger is certified "operational" -- the ship and its on-board systems are supposed to make at least 100 flights before requiring a major overhaul.

Columbia's systems, considered development models, are not certified for 100 missions. But, NASA says, once Challenger is on the job early next year, the veteran spaceship will be taken out of service and its systems upgraded. (TODAY, 7-1-82, p. 16A)

July 4: One of Space Shuttle Columbia's rocket boosters was photographed by a U.S. Navy television camera Saturday on the bottom of the Atlantic Ocean and found to be pretty much intact.

The report set NASA officials to thinking about recovering some of the booster's components, such as data recorders, electronics assemblies and parachutes.

The giant chutes on the boosters failed to deploy after the spent rockets were jettisoned during Columbia's launch last Sunday. The rockets, instead of floating as they were supposed to, plummeted 3,500 feet to the bottom.

NASA said the Navy has "two systems with light salvage capability" -- one in Baltimore, the other in San Diego -- and that one will be brought in for better inspection and possible salvage.

The television camera used Saturday was aboard an underwater sled. (TODAY, 7-4-82, p. 16A)

July 5: More than 1 million telephone calls were made to a special number allowing Americans to listen in on live conversations between the Columbia space shuttle and Mission Control, American Telephone & Telegraph Co. said Sunday.

The company logged 1,025,295 calls during the weeklong space flight, said Carolyn Zachary, spokeswoman for AT&T's Long Lines division. She said 8,000 of the calls were made in the last nine minutes of the flight Sunday. (THE MIAMI HERALD, 7-5-82)

<> Following are excerpts from the text of the White House fact sheet on national space policy issued Sunday:

The president announced today a national space policy that will set the direction of U.S. efforts in space for the next decade....The president's directive reaffirms the national commitment to the exploration and use of space in support of our national well-being, and establishes the basic goals of United States space policy which are to:

- * strengthen the security of the United States;
- * maintain United States space leadership;
- * obtain economic and scientific benefits through the exploitation of space;
- * expand United States private sector investment and involvement in civil, space and space-related activities;
- * ...cooperate with other nations in maintaining a freedom of space for activities which enhance the security and welfare of mankind.

The principles underlying the conduct of the United States space program, as outlined in the directive are:

- * The United States is committed to the exploration and use of space by all nations for peaceful purposes and for the benefit of mankind....

* The United States space program will be comprised of two separate, distinct and strongly interacting programs -- national security and civil....

* The United States Space Transportation System (the Shuttle Program) is the primary space launch system for both national security and civil government missions.

*The United States will pursue activities in space in support of its right to self-defense...

...The directive establishes the following policies governing the development and operation of the Space Transportation System:

* The STS is a vital element of the United States space program, and is the primary space launch system for both the United States national security and civil government missions....

* The United States is fully committed to maintaining world leadership in space transportation with an STS capacity sufficient to meet appropriate national needs.

* The STS program requires sustained commitments by each affected department or agency. The United States will continue to develop the STS through NASA, in cooperation with the Department of Defense....

* For the near term, the STS will continue to be managed and operated in an institutional arrangement consistent with current NASA-DOD Memoranda of Understanding. Responsibility will remain in NASA for operational control of the STS for civil missions and in the DOD for operational control of the STS for national security missions....

...In accordance with the provisions of the National Aeronautics and Space Act, the directive states that the civil space program shall be conducted:

* To expand knowledge of the Earth, its environment, the solar system and the universe;

* To develop and promote selected civil applications of space technology;

* ...To further United States domestic and foreign policy objectives....

The directive states the following policies which shall govern the conduct of the national security program:

* Survivability and endurance of space systems, including all system elements, will be pursued commensurate with the planned use in crisis and conflict, with the threat, and with the availability of other assets to perform the mission....

* The United States will proceed with development of an anti-satellite (ASAT) capability, with operational deployment as a goal. The primary purposes of a United States ASAT capability are to deter threats to space systems and the United States and its allies and, within such limits imposed by international law, to deny any adversary the use of space-based systems that provide support to hostile military forces.

* The United States will develop and maintain an integrated attack warning, notification, verification, and contingency reaction capability which can effectively detect and react to threats to United States space systems..... (TODAY, 7-5-82)

<> President Reagan pledged support for the space program in his Fourth of July address, but made no firm commitment to building a manned space station or a fifth shuttle orbiter as NASA had hoped.

In a speech filled with references to the Old West, Reagan said the shuttle proved Americans still have the "know-how" and "true grit" to tame the savage wilderness.

His words echoed across the bleak Mojave Desert of California, where the aerospace industry has bloomed into an industry of billions of dollars. As governor of the state, Reagan was largely responsible for funding a space shuttle task force in 1971 to win the main shuttle contract for California.

The task force succeeded. In July 1972, exactly 10 years ago, Rockwell International got the \$2.3 billion main contract for the shuttle.

The Mojave is still Reagan country. And if his Independence Day speech didn't spell happy trails for NASA, at least it didn't sound like Death Valley days either.

"I see it as a strong statement of support for what we are doing," said Lt. Gen. James A. Abrahamson, NASA associate administrator for space transportation systems. "He supported us -- that's the key."

With the dummy space shuttle Enterprise behind him as a prop, Reagan said the country must "never forget the benefits we receive are due to our country's commitment, made a decade ago, to remain the world leader in space technology."

"We must look aggressively to the future by demonstrating the potential of the shuttle and establishing a more permanent presence in space," Reagan said in his only reference to a space station. (THE ORLANDO SENTINEL, 7-5-82, p. A-1)

- <> Launch of the space shuttle on its final development mission June 27 within milliseconds of a target liftoff scheduled more than three months earlier has given program officials confidence to move into the operational phase that will carry the burden of U.S. military, commercial and scientific space activities for the next 20 years or more.

The first operational shuttle launch, Mission 5, is scheduled for November 11. Two commercial communications satellites will be carried into a 160-mile orbit by the shuttle orbiter and then propelled into a geosynchronous orbit by a solid spinning upper stage. The payloads are Satellite Business Systems C and Telesat of Canada Anik D satellites.

The 90-hour Mission 4 launch countdown, plus 24-hour hold time, gave National Aeronautics and Space Administration, Defense Department and aerospace contractors an opportunity to test what they hope will be a standard set of countdown tasks. Differences will be dictated by payload servicing requirements and by the number of astronauts in the crew. Mission 5 will be the first to carry a crew of four. (AVIATION WEEK & SPACE TECHNOLOGY, 7-5-82, p. 19, Vol. 117, No. 1)

- <> Martin Marietta's external tank used to fuel the space shuttle's main engines with cryogenic propellants for Mission 4 landed as predicted in the Indian Ocean. Based on

data at the time of separation from the orbiter Columbia, splashdown point was 83.07 East Longitude, 28.41 South Latitude.

The empty tank weighed 75,895 pounds, 107 pounds more than the Mission 3 tank. The added weight came from more instrumentation.

The impact point data indicate that the tumble valve functioned properly. Confirmation that the tank tumbled will come from motion pictures taken by the orbiter. Film will be processed when it is removed from Columbia after landing. (AVIATION WEEK & SPACE TECHNOLOGY, 7-5-82, p. 19, Vol. 117, No. 1)

- <> National Aeronautics and Space Administration and the U.S. Air Force placed numerous personnel at Dakar, Senegal, to support trans-Atlantic abort modes for the fourth shuttle launch.

Yoff Airport, Dakar, unlike Rota, Spain, which was used during previous missions did not have a permanent U.S. presence. This required sending substantial personnel to West Africa.

The bulk of the personnel was from Kennedy Space Center, which is responsible for recovery of orbiter vehicles at all landing locations.

Kennedy sent at least 14 personnel to Yoff. This included five Wackenhut Corporation employees to coordinate crash and rescue operations and to help save the orbiter in the event of a successful emergency landing.

Four Rockwell International personnel also were sent to help remove the crew and tow the vehicle to a remote site at the airport.

Five NASA Kennedy personnel headed by ground operations manager William Lockwood were at Dakar and in charge of safety, security and logistics during the launch. A Kennedy design engineer was present taking core samples of taxiways and potential parking sites to insure the load-bearing capabilities of those areas would support the orbiter.

At least three Johnson Space Center personnel, including astronaut Ron Walker, were at Dakar to assist the orbiter crew in their final approach to Yoff Airport in the event an emergency landing became necessary.

Air Force support included a McDonnell Douglas C-9 medical evacuation aircraft and crew plus a mobile Tacan crew. (AVIATION WEEK & SPACE TECHNOLOGY, 7-5-82, p. 18, Vol. 117, No. 1)

July 6: It's a leaner, cleaner flying machine than its predecessor. But the Shuttle Challenger, which arrived at the sweltering Kennedy Space Center Monday /July 5/ morning on the spine of a Boeing 747, is so far unchallenged by the rigors of Earth orbit.

Almost 1000 space center workers and their families made themselves comfortable with lawn chairs and picnic coolers near the 3-mile-long Shuttle runway when the Challenger-747 duo made a graceful but dusty touchdown at 11:48 a.m.

Shuttle veteran Columbia will return to the space center from Edwards Air Force Base, California, July 16. Space center director Dick Smith predicted its next flight, scheduled for November 11, could be pushed ahead as much as three weeks. "I want to beat it a few weeks. We'll be ready," he said.

The new, improved 1983 model Shuttle will make its flying debut when the Challenger roars from Kennedy Space Center in January. (TODAY, 7-6-82, p. 1A)

<> NASA's Kennedy Space Center is issuing RFP's for an eight-month study to provide an overall analysis of ground operations and deployable spacecraft processing associated with the modules and other elements of modular, incrementally-deployed manned, low-Earth-orbit Space Station.

NASA is hoping to start constructing the Station in about three or four years and have it in space by 1990.

The study will use experience gained from previous space programs to determine approaches to Space Station ground processing and operations, including identification of new and innovative methods.

Specifically, the study is to determine optimum methods of testing, checkout, integration, servicing, troubleshooting, logistics support, quality control, safety, data analysis and problem reporting and tracking.

The study will also estimate manpower, equipment facilities and costs involved in carrying out the ground operations tasks. (DEFENSE DAILY, 7-6-82, p. 12, Vol. 123, No. 2)

July 7: Pan American World Airways Inc., Cocoa Beach, has been awarded a \$1.33 million NASA contract extension for services at Kennedy Space Center and Canaveral Air Force Station. The extension began July 1 and ends October 31 and brings the cumulative contract total to \$14 million.

Pan American has provided medical and environmental services for the space center and Air Force station for the past five years. (TODAY, 7-7-82, p. 12C)

<> This past weekend was a star-spangled extravaganza for the U.S. space program. In rapid-fire sequence as the cameras rolled, the Columbia completed its fourth successful mission, the new Shuttle, Challenger, embarked on its journey to Kennedy Space Center and President Reagan outlined his administration's policy on space. Of the three the last event was least impressive.

The space policy is fine, as far as it goes, but it doesn't go far enough....

"The STS is a vital element of the United States space program, and is the primary space launch system for both United States national security and civil government missions..." the policy states. But without leadership from the White House and a commitment toward specific goals, the program could be further victimized by budget-cutters in Congress who are busily looking for sacrificial lambs.

The administration's apparent indecisiveness on space also is showing up in other ways. Private investors interested in financing a Shuttle are said to be reluctant to put up any money until they are assured they can have a relatively free hand in operating the vehicle for business purposes. That seems to be a reasonable request, yet the White House seems uncertain about whether to go along with such a plan.

An interagency group headed by National Security Adviser William Clark is studying specific space projects and will make recommendations to Reagan about funding priorities. Let us hope those recommendations, and the president's subsequent decisions, reflect the support the space program must have if the United States is to retain its superiority in that field. (TODAY, editorial, 7-7-82, p. 8A)

July 8: Engineers worked Wednesday to remove a tail cone from the Space Shuttle Challenger for shipment to California and installation on the Shuttle Columbia, which needs it for a cross-country trip next week.

The tail cone, which fits over the spacecraft's main engine pods to improve its aerodynamics during shipping, will be dismantled and flown to Edwards Air Force Base by the end of the week, Kennedy Space Center spokesman Dick Young said.

It was installed on Challenger for its flight from California on Sunday and Monday bolted atop a modified Boeing 747 jetliner.

Columbia, which completed its fourth and final test mission Sunday, also will be returned to Kennedy flying piggyback on the ferry plane.

Challenger's first orbital flight is scheduled for January. Work on Challenger will continue as Columbia is prepared for its fifth mission, set for November. After that, Columbia will be taken out of service temporarily for refurbishment.

Young said Columbia was drained of fuel and propellants Wednesday in preparation for its trip to Kennedy. It is scheduled to leave California on July 15 on the overnight return trip to its launch site. (TODAY, 7-8-82, p. 14A)

July 9: Kennedy Space Center Director Richard G. Smith has announced the appointment of Robert G. Long to serve as KSC's director of center support operations.

Long succeeds William M. Lohse, who is retiring effective today after 40 years of distinguished federal service.

Long, who has served as Lohse's deputy since May, 1980, began his federal career with the U.S. Army's Corps of Engineers at Charlotte, N.C., in January, 1955. He joined NASA at what is now the Kennedy Space Center in June, 1962, and served in a number of major managerial positions during the Apollo and Skylab program era and the build-up for the Space Shuttle program that followed.

He was appointed director of administrative operations and support services in January, 1976, remaining in that capacity until he became deputy director of center support operations in May, 1980.

Long was born in Charlotte, N.C., and attended public schools there. He was graduated from Virginia Military Institute with a bachelor of science degree in civil engineering in 1952, and served for two years as an engineering officer in the U.S. Air Force.

Long and his wife, Natalie, live on South Merritt Island.
(KSC RELEASE NO. 171-82, 7-9-82)

<> Federal officials investigating safety conditions as the Shuttle launch pad announced Friday /July 9/ they found the facility met Occupational Safety and Health Administration standards but some space center firefighters say they are not happy with the decision.

It was complaints by five firefighters of exposure to poisonous Shuttle fuel fumes in mid-June that prompted a more than 10-day investigation of pad 39A at Kennedy Space Center, OSHA officials said.

"No citations will be issued. We investigated the complaints and there were no violations of OSHA standards," said Howard Stephens, supervisor for industrial hygiene at OSHA's Tampa office. And he said a spill of some of that

same chemical on June 29 was not a result of any below-standard procedure or equipment at the pad. Stephens would not comment on the case beyond that.

While the government was calling the case closed, some firefighters said they were disappointed with the OSHA findings. Gerald Driskell, a firefighter and official of the Transport Workers Union, called for greater launch pad safety procedures.

"OSHA and NASA are on the pad only when they have to be there. The firefighters and security people have to be there continuously," he said.

As the Shuttle becomes an operational space vehicle and it is on the launch pad with greater frequency the presence of toxic fuels will be more routine but safety precautions cannot be lax, firefighters said.

Driskell recommended a continual, round-the-clock chemical "sniff test" to detect fumes while firefighters maintain a 24-hour presence on the pad.

"It's like an old water pipe--it can work fine for 10 years but you don't know when it's going to bust," said Driskell, referring to machinery that contains the toxic fuels.

But NASA officials said Friday as the Shuttle becomes operational, it would be too great an expense to have a constant monitoring. (TODAY, 7-10-82, p. 1A)

<> Twenty years ago today, the Telstar satellite linked Europe and North America via television and triggered a communications revolution that would shrink the entire globe.

It's still up there, long silent after its 1962 launch from Cape Canaveral Air Force Station, but a whirling monument to the birth of what is now grandly called the Information Age.

Designed and built by the American Telephone & Telegraph Co. and its Bell Laboratories, Telstar was the world's first true "active" satellite, able to receive, amplify and retransmit radio signals in space.

"It is a noteworthy anniversary because if we sit back and look at what's happened to domestic and international communication in the last two decades....it's really been quite extraordinary," says AT&T spokesman Pic Wagner.

"I was 10 years old and living in London and my father made us gather around the TV set," recalled Jonathan Miller, now the managing editor of the Washington-based publications *Satellite Week and Communications Daily*. "I remember the BBC portentously counting down, 5-4-3-2-1, and then nothing happened. The British ground station was aimed at the wrong spot and they missed the signal.

"So we sat and sat and waited for the satellite to come back around again, and suddenly we saw a picture of the American flag flying in the wind," he added. "It was really quite amazing. There was a sense of simultaneous participation on both sides of the Atlantic."

By today's standards, of course, Telstar can only be called primitive. Weighing just 170 pounds with a diameter of 34 1/2 inches, the satellite could handle only a few telephone calls or one television transmission at a time. And it worked for only 226 days before its electronics fell prey to high-altitude radiation.

The satellite also had to be boosted into a highly elliptical orbit, looping around the Earth at a high point of 3,531 miles and a low of 592 miles. Telstar was thus accessible to ground antennas in Europe and the United States for only short periods of time during each orbit.

Telstar was launched at 3:35 a.m. on July 10, 1962, aboard a Delta rocket and the first telephone conversation occurred at 7:23 p.m. between then-Vice President Lyndon B. Johnson in Washington and Frederick R. Kappel, AT&T's chairman, who was at Andover, Maine, where AT&T had built its satellite transmitting antenna. (TODAY, 7-10-82, p. 10A)

July 13: Later this week, a two-armed, deep-sea robot will probe the wreckage of the Space Shuttle's rocket boosters which sank in the Atlantic minutes after Columbia's fourth launch last month, NASA officials said Monday.

The AT&T-built robot will search for the boosters' tape recorders which NASA officials hope will help explain what went wrong after the two rockets peeled away from the Shuttle two minutes after liftoff and splashed down 150 miles east of Kennedy Space Center.

The \$36 million booster casings, which are reusable, are supposed to float. On Columbia's first three missions they worked properly, but on the fourth launch, they sank in 3,100 feet of water. Space agency officials have said Columbia, scheduled to fly its fifth mission in late October or early November, won't be launched again until they determine why the canisters sank.

The robot is scheduled to sail from Baltimore today aboard a NASA booster recovery ship and will arrive here Thursday or Friday.

Armed with claw-like pincers, underwater television cameras, sonar and a metal cutter, the remote-control robot will try to retrieve tape recorders located inside the boosters. The tape recorders are similar to the crash-proof "black boxes" carried aboard commercial airliners to record cockpit conversations.

"They record the sequence of events and if the right signals got through the pyrotechnics that command stages to separate and the parachutes to open," NASA spokesman Mark Hess said.

NASA has said the parachutes that slow the boosters descent apparently failed to open properly, but investigators are trying to pinpoint the exact cause of the malfunction.

The robot, called Scarab, for Submersible Craft Assisting Repair and Burial, is the size of a compact car and can probe depths of up to a mile. The robot will be controlled by technicians aboard the UTC Freedom, one of the Shuttle's two booster recovery ships.

It is not anticipated that the boosters will be recovered. At least one is broken up in large pieces. (TODAY, 7-13-82, p. 10-A)

July 14: A study to determine the best methods for setting up a central management complex to direct Space Shuttle operations at Vandenberg AFB is being conducted by Boeing Services International for the Air Force Space Division. The central management complex will be built within the Shuttle launch and recovery facilities at Vandenberg. Under a \$235,000 contract awarded by Kennedy Space Center and to be completed by the end of next month, Boeing will:

1) Recommend integrated management structures to coordinate the various management styles of contractors and government agencies and determine the appropriate flow of information between the parties.

2) Recommend facility layouts, computer equipment and information systems; identify which parts of the complex should be automated and which should be manual, and design the layout of management rooms where charts depicting program status will be displayed. (DEFENSE DAILY, 7-14-82, p. 61, Vol. 123, No. 8)

July 15: "The most recent NASA estimate for operational turnaround time (achievable by STS-30, the 30th flight) is 51 days for processing an Orbiter from landing to launch. This represents an increase of 20 days from the previous estimate, based on a post STS-1 reassessment. The current 51-day turnaround and processing procedures at KSC (Kennedy Space Center) will allow only 14 flights per year. Current SRB (Solid Rocket Boosters) stacking operations used by KSC in turnaround appear to be a primary limiting factor. The 14 flights per year is less than the planned flights per year for FY '86 and subsequent years" -- NASA Office of Inspector General Audit Report, May 27, 1982. (DEFENSE DAILY, 7-15-82, p. 71, Vol. 123, No. 9)

<> Landing moments before a cooling thundershower, the Space Shuttle Columbia returned to Kennedy Space Center Thursday morning and NASA engineers said they plan to remove the spacecraft's secret defense department cargo Sunday.

Columbia, slightly scorched from a fourth mission in space, made the 2,000 mile journey across the United States attached to the top of a Boeing 747 in two days.

The 1,053-mile jaunt ended with a routine landing on the KSC runway at 10:33 a.m.

Columbia will make this piggy-back ride from the Shuttle landing site at Edwards Air Force Base, California, only one more time -- following the end of the fifth mission in late October or November. After that, subsequent flights of Columbia will launch and then land at KSC's 3-mile-long runway.

The combo was towed to the steel crane that unhooks the spaceship from the 747 following the landing. Columbia was scheduled to be moved to its hangar by early this morning, said Herman "Fritz" Widick, Orbiter processing manager.

Widick said the hangar, which now houses Columbia's sister Shuttle Challenger, will be cleared of all personnel except most entrusted to remove the Shuttle's secret Air Force cargo. Publications close to the aerospace industry have speculated the instruments include an infrared camera designed for early warning missile detection.

The instruments and their tape recorders of data will be shipped to defense department labs for analysis.

With Columbia's arrival, KSC engineers have two manned spacecraft being processed here at the same time -- the first time that has happened since the Skylab program in the early 1970s.

Challenger, scheduled to make its first space voyage in January, arrived at KSC from its California manufacturer July 5.

Widick also expressed confidence Columbia can be launched for its first satellite-carrying, operational flight before the planned November 11 date. "October 29 is very achievable, although it is still only a target date," he said.

Columbia will carry a crew of four and two satellites into orbit on its next flight. After that, it will be temporarily retired for a major overhaul while Challenger steps in. (TODAY, 7-16-82, p. 16A)

<> NASA's John F. Kennedy Space Center has awarded Boeing Services International, Inc., Kennedy Space Center, Florida,

a supplemental agreement valued at \$46,833,660 to an existing contract. The award provides for Boeing to perform Ground Support Operations services for a sixth contract year at the Space Center.

The contract modification covers a one-year period from July 1, 1982, to July 30, 1983. This agreement brings the total value of the cost plus fixed fee contract to \$308,932,101. (KSC RELEASE NO. 175-82, 7-16-82)

<> NASA's John F. Kennedy Space Center has awarded Boeing Services International Inc. of Kennedy Space Center, Florida, a one-year, \$11,752,020 extension of its contract to provide supply and transportation services to KSC.

This extension will mark the fifth consecutive year that Boeing has provided such services to KSC. The basic contract went into effect in July, 1978. The services include shipping, repair, supply and distribution of manufactured items. The extension brings the cumulative contract value to \$53,228,250. (KSC RELEASE NO. 172-82, 7-16-82)

July 17: An anniversary cake for 1,800 people was devoured in 90 minutes Friday /July 16/ as thousands gathered to remember the first moon landing 13 years ago and to have a peek at the future.

Former astronauts and space center alumni assembled in the visitors center auditorium Friday morning to tell hundreds of tourists what they remembered about July 16, 1969, and to emphasize its importance.

"The landing on the moon and return will probably be considered the greatest events to happen in this century," said Bob Murkshe, co-chairman of the Apollo 11 Commemoration Association.

"As time goes by things tend to get a little fuzzy. We formed the committee...to make sure people did not forget." (THE ORLANDO SENTINEL, 7-17-82, pp. C-1 & C-7)

July 18: The space shuttle Columbia will make its first commercial trip into space on November 11, after all. It seems that while the shuttle and its cargo will be ready to go in October, NASA's paying customers won't be.

Last Tuesday /July 13/, the space agency announced that it had shaved 13 days from the "turnaround" time between flight four and flight five and that the next launch would be October 29.

That apparently surprised Satellite Business Systems of McLean, Virginia, and Telesat Canada, Inc., who are shipping two communications satellites aboard the shuttle to be placed into space.

A NASA source said the firms told the space agency that their work on the ground such as getting receiving equipment ready, was predicated on the November 11 target date.

So NASA, on Friday /July 16/, announced that as the new launch target date.

The satellites, in the cargo bay, will be expelled by spring-like devices at an altitude of about 172 miles.

Columbia then moves a short distance away and a rocket called a solid spinning upper stage will ignite to boost the satellites to a "parking" orbit 22,300 miles above Earth. At that height, a satellite rotates in step with Earth and thus remains over the same spot all the time. (THE MIAMI HERALD, 7-18-82)

<> * Now that space flights are routine, they will be used to solve those scientific mysteries which for centuries have plagued mankind. First, let's find out if its easier to remove the first olive from the jar at zero gravity.

* Also, is there dandruff in space or does it just float away?

* Then, let us discover whether or not a game of billiards in space must be played with tennis rackets.

* After which, we can probe the unknown for the answer to the question -- is there a place in orbit where you can go out for a good time on a Saturday night without spending an arm and a leg?

* NASA has been talking about using the Space Shuttle for fancy experiments with chemicals and metallurgy, but I think people are more interested in developing a non-gravity peanut butter that won't stick to the roof of your spaceship. (TODAY, "MARK RUSSELL", 7-18-82, p. 15A)

July 19: The Air Force is studying a miniature version of the space shuttle that would launch from the top of a jumbo jet.

The spacecraft, called an air launched sortie vehicle, resembles the rocket ship in the James Bond movie MOONRAKER. It is designed to fly unmanned but could be modified for manned missions, according to a report by the Boeing Aerospace Co.

The minishuttle could begin flying as early as 1988, Boeing predicted.

Military payloads already make up the bulk of the shuttle's future missions. But unlike the shuttle, Boeing's smaller version could take off from virtually any large airport in the world on a few minutes notice.

On a typical flight, the minishuttle would ride to about 37,000 feet atop a Boeing 747 jetliner. With the carrier plane pointing in a 60-degree flight angle, the spaceship would fire nine small rocket engines to reach orbit.

Once in space it could act as a tanker, delivering a small cargo. It also would be ideal for spying missions, able to fly over any point on earth on short notice. (THE ORLANDO SENTINEL, 7-19-82)

July 20: Because of bad weather and a balky camera, officials failed Monday to photograph the two rocket boosters that sank in the Atlantic during the fourth space shuttle launch.

A NASA spokesman said strong currents and trouble with the video camera of a special deep-sea robot device forced two special recovery ships to return to the Cape.

After installing a new cable, the ships will leave port later this week to make another try at photographing the casings in 3,500 feet of water, 160 miles east of the spaceport.

Officials are trying to learn why the rockets did not hit the ocean and float after peeling away from the shuttle orbiter Columbia 2 minutes after blastoff on June 27. Officials agree that parachutes failed to open, but they do not know why. (THE ORLANDO SENTINEL, 7-20-82, p. B-6)

July 23: Cal Burch has been appointed Chief of the Launch Operations and Physical Security Branch. He is succeeding G.E. Morford, who retired.

Burch will manage the electronic security, communications security and physical security systems. Physical Security includes guards, grounds, badges, alarms, payload and VIP protection.

A 1967 graduate of Auburn University, Burch began his federal career in 1968 as a military police officer in Viet Nam. He worked in the Division of Security of the Atomic Energy Commission and assisted the security inspector for the Department of Energy.

Having just completed his first month with KSC, Burch says he enjoys the operational end of security and is looking forward to working with all elements of KSC. (SPACEPORT NEWS, 7-23-82, p. 6, Vol. 21, No. 15)

<> A group of Kennedy Space Center contractors and government employees are being awarded \$100 for discovering new technological items as a result of a contract with NASA.

The winners and their inventions are as follows: William J. Steinway, Marietta, Georgia, with the Georgia Institute of Technology, is responsible for developing a high

resolution soil layer depth measurement. Frank E. Winner, Merritt Island, of Martin Marietta developed an explosion proof electronic position indicator.

Charles J. Gillespie, Titusville, with Rockwell International invented a tool that would seal a vent door without damage. James E. Myers, Rockledge, also with Rockwell, invented a waterproofing tool.

Robert W. Johnson, Gainesville, of USDA Soil Conservation Service, together with Robert A. Glaccum, Miami, with Technos, Inc. and Ronald J. Wojtasinski, Cocoa Beach, representing NASA, came up with a soil sensing technique using radar. This would allow scientists to monitor changes in the earth and test the soil for building, sanitation and agriculture purposes.

Feng-Nan Lin, William L. Moore and Floyd E. Lundy, Jr. all from Titusville, and representing NASA, designed a butterfly valve that regulates the flow of water for the sound suppression water system. That system absorbs vibration and sound by remote control during space launches.

To be eligible for an award, the new technology must be under contract and in connection with the space program and be approved for publication in "NASA Tech Briefs". The awards are provided as part of the NASA awards system. (SPACEPORT NEWS, 7-23-82, p. 3, Vol. 21, No. 15)

<> "The Kennedy Space Center's excellent performance in processing and launching the Space Shuttle has been recognized again on the highest levels," noted KSC Director Dick Smith as he released congratulatory messages on the STS-4 mission from NASA Administrator James M. Beggs ...

Said Beggs in a telex to the KSC Director:

"In his remarks on the landing of the Space Shuttle Columbia, President Reagan stated that '...now we will move forward to capitalize on the tremendous potential offered by the ultimate frontier of space.'

"Clearly, the President's remarks reflected his confidence in our ability to do the job -- a confidence that has been

built and fostered by NASA's proven excellence on Mercury, on Apollo, and more recently, on the Space Shuttle. They have been great successes.

"However, the credit for these successes belongs to every member of the NASA team. All of you have continued to demonstrate the same selfless dedication to total performance that has characterized NASA since its inception.

"It would be impossible for me to give everyone at Kennedy Space Center the individual recognition that is so highly deserved. Nevertheless, I would be most appreciative if you might convey to every member of the KSC team -- both our civil service personnel and our contractors -- my thanks and appreciation for a job very well done."

Noted Smith: "The attention of the world is focused on what we do here and how well we do it. Once again, all of you have come through magnificently. And I'd like to add my personal thanks to those of Administrator Beggs and Deputy Administrator Mark." (SPACEPORT NEWS, 7-23-82, p. 1, Vol. 21, No. 15)

July 24: America's first astronaut baby was born Monday to astronauts Dr. Rhea Seddon Gibson and Robert "Hoot" Gibson.

The baby boy developed a slight breathing problem and was transferred to a Houston hospital, a space agency spokesman said.

Paul Seddon Gibson, weighing seven pounds, two ounces, was born at 4:10 a.m. at Clear Lake Hospital near the Johnson Space Center. Mrs. Gibson became the first of eight female astronauts to give birth.

The infant began having difficulty breathing about 4 p.m. and was flown by helicopter to Hermann Hospital's neo-natal care unit, about 20 miles away, said Steve Nesbitt of NASA.

"There's no real serious threat," Nesbitt said. "The hospital in Clear Lake really doesn't have the kind of facilities to handle cases that need more than the normal attention." (TODAY, 7-24-82)

<> Eskimo igloos in the Arctic regions of Canada will be warmed by that black box called television thanks to a satellite that will circle the globe at 22,000 miles up.

Anik D, scheduled to launch aboard a Delta rocket from Cape Canaveral Air Force Station August 19, will bring television to some of the most remote parts of western and Arctic Canada, said William Zatychech, director of TELESAT Canada's satellite division.

"Some people don't want to live up there unless they have communications with South Canada," he said.

With 24 transmitter/receivers, Anik D will have the capability to transmit television, telephone and data to subscribers throughout the country. Each transmitter/receiver can accommodate one television program or about 500 telephone calls.

Zatychech said the \$30 million satellite will orbit the Earth over western Canada near Winnipeg and should be operational about six weeks after launch.

"Essentially, Anik D will more than double satellite communications in Canada," Zatychech said.

Anik D will join four other Aniks already in space and one following will have the distinction of being one of the first satellites to be launched aboard the Space Shuttle's fifth mission in November.

The 2,500-pound satellite will be launched between 7:22 and 9:43 p.m., August 19.

Anik, which means "little brother" in Eskimo, originally was set to launch August 12. But delays in launching the LANDSAT satellite at Vandenberg Air Force Base, California, July 16, were responsible for postponing the Anik launch.
(TODAY, 7-24-82)

July 28: Four Kennedy Space Center security guards were hospitalized early Tuesday after they were exposed to poisonous fumes at the Space Shuttle launch pad, NASA officials said.

All were released from Jess Parrish Memorial Hospital in Titusville by noon, 11 hours after they were admitted at 1 a.m., hospital officials said.

"They are in excellent condition," said Chris Healy, the hospital's assistant director of nursing services.

The guards were held for observation after they complained of sore throats and headaches, Healy said.

The incident brings to three the number of toxic fuel leaks at the pad since early June.

The guards, all employees of Wackenhut Services, Inc., were Joseph Varanay, 58, of Rockledge; Kathleen Carroll, 30, of Cocoa; Susan Barton, 26, of Titusville; and Kent Banks, 25, of Merritt Island.

They are expected to return to duty today or Thursday. (TODAY, 7-28-82, p. 1A)

July 29: After landing on desert runways on its first four flights, the Space Shuttle Columbia will probably return next time to the concrete strip near its Kennedy Space Center launch pad, a senior NASA official said Wednesday.

Deputy Administrator Hans Mark, appearing before a congressional committee with the astronauts who returned from space earlier this month, said also that the \$36 million loss of the Shuttle's two rocket boosters may have been caused by two miscalibrated sensors.

The landing at Kennedy Space Center on Flight Five has been a on-again, off-again proposition. Officials had hoped first to get some experience landing in the kind of crosswinds that blow across KSC's 15,000 foot runway.

But the crosswinds weren't there on the previous flights -- three on the desert floor, one on a concrete runway on the desert -- and Mark said the Kennedy landing "probably" would be attempted without the cross wind experience.

"There is a debate, but most of us think we ought to go to Kennedy," he said. The previous "official" word had been that a KSC landing would not be attempted until the seventh flight, next year.

Mark appeared with Flight Four astronauts Thomas K. Mattingly, Jr., and Henry Hartsfield before the House Science and Technology Committee. Columbia's next trip into space is scheduled for November 11-15.

The spent rockets that boosted the Shuttle on its way to orbit plunged to the bottom of the Atlantic, instead of being lowered by giant parachutes to be recovered by waiting ships as planned.

The 150-foot long boosters have three main parachutes, each attached by lines, called risers, at two points. To facilitate the boosters' recovery, the risers are supposed to be cut by two explosive charges when the booster hits the water -- each charge cutting three alternate lines. The explosives are triggered by a sensor that reacts to shock.

Mark said the sensors are calibrated to ignore the shock of the chute opening. On the last flight, he said deployment of the 115-foot diameter parachutes apparently triggered one sensor on each booster, cutting half the risers and preventing the chutes from opening. (TODAY, 7-29-82)

July 30: The House by voice vote has adopted a resolution congratulating NASA, the astronauts and the contractor and subcontractor team for the successful completion of the Space Shuttle flight test program and the entry of the U.S. "into a promising new era of space flight..." The Senate passed an identical resolution last week. (DEFENSE DAILY, 7-30-82, p. 158, Vol. 123, No. 20)

AUGUST 1982

August 2: A remote-controlled submarine operated by Lanham-based East Port International has located and photographed one of the two space shuttle booster rockets that sank 100 miles off the Florida coast after the June 27 launch.

The tiny submarine, named Scarab 2, began searching for the two \$24 million boosters two weeks ago. It carries no crew and is operated from a surface ship.

Roy Ewing, manager for technical services at East Port, declined to disclose when the submarine first located the booster rocket. But he confirmed that film and videotape of the 150-foot-long, 80-ton booster have been sent to the National Aeronautics and Space Administration at Marshall Space Flight Center in Huntsville, Alabama, for review by scientists.

"We've shot a lot of hours of film and of videotape," Ewing said. Several cameras are mounted on the submarine's all-aluminum housing, in addition to two claw-like contraptions that can grasp and manipulate objects on the ocean floor.

Ewing said the submarine is now looking for the second booster.

A NASA investigations board at Marshall will examine the rocket booster pictures to determine what, if any, action to take next, NASA representative Lyn Cywanowicz said.

Cywanowicz said that nothing else has been done with the boosters so far and that nothing has been brought to the surface.

East Port's Ewing said the search-and-survey project NASA contracted the firm to undertake has been running a little behind schedule because of minor delays.

Some repairs have been made on Scarab because of problems with debris it encountered in the 3,500 feet of water where the boosters sank, he said. (THE WASHINGTON POST, 8-2-82)

August 3: More than 10,000 space center employees have been told they could be laid off next month if Congress doesn't grant a \$31 million budget request to pad the NASA payroll until the end of the fiscal year.

But NASA aides in Washington and U.S. Rep. Bill Nelson of Melbourne agreed Monday that the budget bill probably will pass easily, and that the chance of employee "furloughs" for up to 10 days, as proposed, is slim.

Space center employees received notice last week of potential layoffs because a federal law requires that they be warned a month in advance of any layoff of less than 30 days, /Mary Kerwin/ said. (THE ORLANDO SENTINEL, 8-3-82, p. B1)

August 5: Retiring Johnson Space Center director Christopher C. Kraft Jr. said Wednesday the Reagan administration should spend more money for space research instead of bombers and missiles.

Kraft, who played a key role in the U.S. manned space program and in development of the Space Shuttle, made the comment at a farewell news conference.

"I don't understand how this country can spend \$222 billion in the next 3 1/2 to 4 years on the B-1 bomber and the MX missile and not be willing to spend another half-billion dollars per year on the space program," he said.

Kraft, 58, will leave the space agency on Saturday. He announced earlier this year he intended to retire in November and the earlier departure came as a surprise.

"It's time for a new leader," he explained....

Kraft said the major challenge for the new director, Gerald D. Griffin, will be to refine the uses of the Space Shuttle and to promote the development of the manned space station.

Griffin is the former deputy director of the Kennedy Space Center.... (TODAY, 8-5-82, p. 1)

<> NASA made it official Thursday -- the space agency will accept bids from aerospace companies for a multimillion dollar contract to operate the Shuttle program at Kennedy Space Center.

The space agency will accept proposals from as many as eight firms by November and NASA administrator James Beggs is expected to select a contractor in mid-1983.

Since November 1981, firms such as United Airlines and Grumman Aerospace have had teams of engineers observing Shuttle launch preparations.

Under the Shuttle Processing Contract, one company would be selected for overall launch preparations and Shuttle maintenance -- consolidating the work of several smaller contractors.

Presently Rockwell International is the major Shuttle contractor and it too must compete for the new contract.

Beggs' announcement Thursday confirmed that NASA is committed to a Shuttle Processing Contract, said Dick Young, KSC spokesman.

"The Shuttle processing philosophy was formally adopted. It will greatly increase effectiveness and reduce costs," he said. (TODAY, 8-6-82, p. 16A)

August 6: NASA's John F. Kennedy Space Center has awarded General Cable Company, Fiber Optics Division of Edison, New Jersey, and Pearl, Mississippi, a contract to install fiber optic communication cable at the Kennedy Space Center.

Work under the fixed-price contract valued at \$734,107 began June 28, 1982, and is due to be complete by January 27, 1983. (NASA NEWS RELEASE NO. 178-82, 8-6-82)

<> NASA's Kennedy Space Center, Florida, has selected Computer Sciences Corporation, Falls Church, Virginia, for final negotiations leading to award of \$9,372,000 firm, fixed-price contract for a Space Shuttle Inventory Management System (SIMS) II.

SIMS II will assist NASA in ensuring that spare parts, supplies and materials are available as needed to support the Shuttle program. The contract will call for delivery of automatic data processing equipment; communications equipment; computer software; data requirements; training for terminal users, computer operators and system controllers; and software creation and maintenance personnel.

The system will be used to control the location and movement of material to support Shuttle material needs at the Kennedy Space Center, including spare parts for the Shuttle and cargo ground support equipment, flight hardware and other projects within the Center's responsibility. It will also be used to provide management of institutional support requirements.

Similar work under the contract will also be performed at Vandenberg Air Force Base, California.

Also bidding on the contract were: Northrup Services, Inc., Winter Park, Florida; Pan American World Services, Inc., Cocoa Beach, Florida; and Martin Marietta Data Systems, Englewood, Colorado. (NASA NEWS RELEASE NO. 82-120, 8-6-82)

- <> NASA's John F. Kennedy Space Center has awarded Industrial Steel, Inc. of Mims, Florida, a contract to manufacture test equipment for the Space Transportation System.

Industrial Steel will procure adapters and test fixtures to proof-test the Space Transportation System lifting and handling equipment. This equipment will be used to handle STS flight hardware, including Space Shuttle Orbiters and their subsystems, such as the payload bay doors and the reaction controls system.

This firm-fixed-price contract valued at \$50,348 began July 28 and will end February 1, 1983. (NASA NEWS RELEASE NO. 187-82, 8-6-82)

- <> William M. Lohse, KSC Director of Center Support Operation, has retired after 40 years of distinguished federal service.

Lohse served as Director, Procurement Supply and Transportation for three years at KSC before being appointed Director of Center Support in 1980.

As Director of Center Support Operations his responsibilities were to provide general support services (base support functions) for all KSC and tenant organizations on the John F. Kennedy Space Center.

Before retiring from the U.S. Navy as a Captain in 1965, Lohse had a widely varied career in supply and procurement with the Navy.

When asked the highpoints of his NASA career, he came right to the point:

"Apollo--terrific and shuttle contruction--outstanding!" He added, "But above all...the great people I had a chance to work with."

Lohse expressed his sincere thanks to everyone for the "...nice (retirement) coffee and outstanding party."

He said his immediate plans include, "Playing golf and getting the house in order."

He and his wife Gertrude reside in Cocoa. (SPACEPORT NEWS, 8-6-82, p. 4, Vol. 21, No. 16)

- <> The man who will oversee the launch of the next Space Shuttle said despite reports to the contrary, the Shuttle won't land at Kennedy Space Center earlier than the seventh flight in April 1983.

Thomas E. Utsman, KSC's newly appointed Shuttle launch director, also predicted the Columbia's fifth mission will begin as planned on November 11 as preparations for the first satellite deployment continue without a snag.

The 45-year-old Utsman said in an interview Friday that more tests of the Shuttle's computerized automatic landing system are needed in the wide expanse of the California desert at

Edwards Air Force Base before astronauts attempt to maneuver on the 15,000-foot-long, 300-foot-wide concrete runway at Kennedy. (TODAY, 8-7-82, p. 1A)

<> A NASA investigation team has decided to salvage parts of the space shuttle's sunken solid rocket boosters from the bottom of the Atlantic Ocean, but the job will be ticklish, space center spokesmen said Friday.

One of the boosters was shattered, but a 40-foot section of the second remained intact when booster parachutes failed to open and the casings hit the water during Columbia's fourth launch June 27.

The recovery effort will begin as soon as the team develops a salvage plan for securing and lifting the booster pieces, which are resting in about 3,500 feet of water about 150 miles off Cape Canaveral.

"We really don't have a feel for how long that means, but it will be as soon as possible," said KSC spokesman Ed Harrison. The pieces are expected to be difficult to lift. (THE ORLANDO SENTINEL, 8-7-82)

August 7: William H. Young, longtime Orlando resident and father of astronaut John Young, died Saturday after a long battle with cancer.

Born one year before the Wright brothers' flight at Kitty Hawk, the 80-year-old engineer saw his son log five trips to space, walk on the moon, and command the first voyage of the space shuttle.

The elder Young is survived by his wife, Ruth; sons John W. Young, of Houston; Hugh H. Young, of Fukuoka, Japan, stepson, James W. Mosteller of San Diego; stepdaughter, Mrs. Mary M. Stuckey, Independence, Kansas; brother Heyward Young of Lewiston, N. Y.; sister, Mrs. Sarah Y. Hebble of Cartersville; and eight grandchildren. (THE ORLANDO SENTINEL, 8-9-82, p. A-9)

August 9: The space agency is laying the groundwork for a permanent orbiting space station and the NASA administrator said construction could begin in 1985 and be finished in the early 1990s.

James Beggs said the Reagan administration still has to be convinced there is a need for such an orbital base, but he said he is optimistic that approval eventually will be received from the White House and Congress.

The National Aeronautics and Space Administration chief also said there is still a possibility that the space shuttle Columbia will land at the Kennedy Space Center at Cape Canaveral, Florida, on its next mission in November even though the plan now is to land at Edwards Air Force Base, California. (THE ORLANDO SENTINEL, 8-9-82, p. A-7)

<> The health of the Kennedy Space Center's first launch operations director has rebounded since last year, when he suffered a near-fatal reaction to kidney dialysis equipment.

Kurt Debus, who directed the launch of 282 rockets at KSC from 1953 until his retirement in 1974, spends most of his time now at his Cocoa Beach home. While retaining an avid interest in man's space exploration efforts, the 74-year-old electrical engineer no longer is involved in KSC operations.

"1981 was a difficult year," said Gay Debus, his wife. "They tried to put a dialysis device in his abdomen so he could hook up to the machine easier, but it caused very bad internal bleeding."

After a nine-day hospital stay in the intensive care unit, he has shown continual improvement.

...Invitations to speak before scientific conventions in Europe and America continue to arrive. However, he has been unable to accept the offers, she said....

Debus' retirement in 1974 came as a surprise to many. He was 66 years old.

"There are younger men, a younger generation. We must give them a chance," he said at the time.

Debus did not, in any way, look upon his retirement as a sad event: "We have begun to develop the sets of tools to solve our worldwide problems," he said. "I have lived through the most interesting of times. The world has seen a period of 30-40 years which provided nearly all of our technical knowledge....No period in the past holds any great interest for me -- I can dream about the future. I have a good idea what's going to happen." (TODAY, 8-9-82)

<> Except for the 1963 mission of cosmonaut Valentina Tereshkova, "manned spaceflight" has meant just that: for nearly 20 years the stratosphere has been an all-male preserve. Now the Soviet Union is preparing to put a second woman in orbit when it launches Soyuz T-7 later this month. Marina Savitska is the woman most likely to blast off. Two men will accompany her on the mission, which will follow the pattern of Soyuz T-6. That one had another kind of mixed crew: two Soviets and a Frenchman. (NEWSWEEK, 8-9-82)

August 10: ElectroSpace Systems, Inc., of Richardson, Texas, has won a \$1,600,000 contract to provide computer-controlled data switching equipment for use in the firing rooms of the Space Shuttle Launch Control Center.

Under the fixed price contract, the company will design, fabricate, test and deliver four Remote Controlled Video Switch Subsystems for use in the Space Shuttle's Launch Control Center. The subsystem is a computer controlled switching matrix which allows an operator to connect as many as 100 data channels to as many as 80 recording and display units. The new switching matrices will allow KSC to process multiple Space Shuttle orbiters using firing rooms simultaneously.

ElectroSpace Systems, Inc., a small business firm, will perform the work at its plant location in Texas in a period of 12 months and three weeks from the contract date. (KSC RELEASE NO. 188-82, 8-10-82)

<> It will cost at least \$266 million to fly each of the five space shuttle missions planned for 1983 -- seven times the amount NASA plans to charge its customers.

The total price tag for the shuttle program is now expected to top \$21 billion, including \$18 billion spent by NASA and \$3.6 billion invested by the Department of Defense, space officials have told Congress.

The space agency will suffer a huge financial loss on early shuttle flights, and may end up losing billions of dollars during the program's first years of operation, according to a report by the General Accounting Office.

NASA charges customers about \$38 million to rent the shuttle's entire cargo bay -- less than one-seventh the true cost. The Columbia is scheduled to carry its first satellite cargo in November, during its fifth trip to space.

But it will be 1989 at the earliest before NASA recovers the full flight cost from shuttle users, NASA officials say.

NASA will pay 80 percent of shuttle flight costs during the next three years, while flying only about 36 percent of the shuttle missions, the GAO estimated. That represents a \$2.2 billion subsidy -- in 1982 dollars -- to other users, the agency reported.

The space agency is trying to recoup some of that money by increasing the launch fees paid by the military, which has booked nearly half of the scheduled missions. (THE ORLANDO SENTINEL, 8-10-82, p. B-1)

August 12: Installation of experiments on the Spacelab 1 pallet was completed last week with the attachment of the European Space Agency (ESA) Bridge - a platform supporting 12 European experiments.

"With installation of the bridge, we have completed physical integration of all Spacelab 1 scientific experiments," said Harry Craft, Spacelab 1 mission manager of NASA's Marshall Space Flight Center, Huntsville, Alabama. "We are proceeding smoothly toward beginning power-up of the experiments in late August. Following power up, we will begin a functional checkout of each experiment...."

Integration and checkout of Spacelab 1 experiments and preparations of the laboratory for flight aboard the Space Shuttle is being accomplished at the NASA's Kennedy Space Center in Florida. An ESA resident team at Kennedy is participating in these activities.

Marshall Space Flight Center is the lead NASA Center for Spacelab, and is also responsible for overall management of the first three Spacelab flights, and for monitoring development activities in Europe.

Spacelab 1 is a joint ESA/NASA mission, scheduled for launch aboard the Space Shuttle in September 1983. (NASA NEWS RELEASE NO. 190-82, 8-12-82)

<> The Space Shuttle Columbia and the two satellites it will carry into orbit should make their November 11 date in space, but the Shuttle Challenger may not get off the ground in time in January, engineers said Thursday.

A delay of several days in the delivery of Shuttle main engines to Kennedy Space Center could hold up the Challenger's maiden flight, now set for January 20, said James Harrington, chief of Orbiter operations.

"I have no feel for when the main engines will get here," he said, adding that the slowness in some testing procedures also might hold up the spacecraft's first flight. "I don't know if it can fly in January but we're going to try," said Harrington, who gave reporters a guided tour of the Shuttle hangar Thursday morning.

Officials of Rockwell International, the prime Shuttle contractor, said they were optimistic the Challenger would be ready for launch on time and predicted engines would be at the space center in plenty of time for installation in the spacecraft.

Right beside the Challenger in the hangar is Columbia -- a proven veteran of space flight. By September 10, technicians will have completed the repairs and modifications needed for the fifth mission. Only Columbia's toilet will get a late reinstallation while the Shuttle is on the launch pad in October. Harrington said the toilet's

slinger, designed to pulverize and sterilize waste matter, did not work up to par during the last mission and was returned to its manufacturer for repairs.

The two communications satellites that will be deployed into space aboard the Columbia also will be installed three weeks before launch, while the spacecraft is on the pad.

One satellite, operated by TELESAT of Canada, will serve educational television and pay television customers in southern Canada, the most populous region of the country. The other, owned by Satellite Business Systems, will serve American businesses relaying data across the country. Engineers with both satellite companies said they chose the Shuttle because it is far cheaper than the rockets previously used to send their cargo into space.

"This is a good buy," said Michael Lyons, satellite business systems mission manager, in comparing the \$23 million rocket launch price with the \$9 million Shuttle price. The satellite themselves are valued at about \$22 million each.

Only 8 1/2 hours after launch, the Satellite Business Systems satellite will be ejected from the Columbia's 60-foot-long cargo bay on springs at a speed of 3 feet per second. The Canadian satellite will follow 24 hours later.

Both will reach their final destination 22,000 miles up four days later as they ride on a rocket engine called the Payload Assist Module or PAM. (TODAY, 8-13-82, p. 16A)

August 13: The space shuttle Columbia is expected to be processed in record time for its fifth flight, and its first two paying customers are putting final touches on the satellite cargo.

Processing for the November 11 launch should take no more than 40 days, about a week less than it took for the last mission, a NASA official said Thursday/August 12/.

After processing, the orbiter is scheduled to be taken to the Vehicle Assembly Building September 10, and to the pad later next month, said Jim Harrington, chief of orbiter operations. (THE ORLANDO SENTINEL, 8-13-82, p. B-1)

August 14: Astronaut Sally Ride, set to become the first American woman to fly into space, and astronaut Steve Hawley were married last month in Salina, Kansas, the couple told friends this week. (TODAY, 8-14-82, p. 14A)

August 16: West German scientists Monday/August 16/ unveiled a "getaway special" experiment to be flown on America's space shuttle in November.

The experiment, in a special canister aboard Columbia, will consist of an attempt to take x-rays of a gallium-and-mercury metallic chemical mix as it is heated to a molten state and then allowed to cool.

Scientists hope to track the gallium into mercury and then back out.

The material weighs less than one gram.

Dr. Guenther Otto of the Institute for Space Simulation in Koeln, West Germany, classified the experiment as "pure research." Although it has no immediate practical value, the experiment may lead to future breakthroughs in the field of materials processing in space, he said.

The German Ministry of Research and Technology has reservations to fly 25 materials-processing experiments aboard future space shuttle missions, said Kennedy Space Center spokesman Rocky Raab. (THE ORLANDO SENTINEL, 8-17-82, p. B-4)

August 17: NASA's John F. Kennedy Space Center has awarded Hall-Mark Electronics of Orlando, Florida, a contract for additional firing room equipment.

Four operational firing rooms will eventually be needed to fulfill the ambitious flight schedule of the Space Transportation System's fleet of four orbiters. Two of the four firing rooms are operational and are used for orbiters Columbia and Challenger.

The firing rooms, located in the Launch Control Center, are equipped with a highly automated launch processing system designed to automatically control and perform Shuttle checkout and launch activities.

The launch processing system continually monitors thousands of measurements of temperatures, pressures, flow rates, liquid levels, turbine speeds, voltages, currents, valve and switch positions, and many other parameters.

The Remote Control Video Switcher System (RCVS) routes data from the orbiter to the Launch Control Center and then distributes the data to the appropriate firing room. This switcher system will need to be expanded before firing rooms three and four can become operational.

Hall-Mark Electronics, under a firm, fixed-price contract, will deliver micro module chassis and peripheral equipment required for the expansion of the remote switcher system.

The contract has a value of \$36,984 and the equipment is due to be delivered by October 1, 1982. The third firing room is scheduled to be ready by December of 1982 and the fourth should be complete by December of 1983. (NASA NEWS RELEASE NO. 194-82, 8-17-82)

August 19: Work has begun on what will be a \$15.5 million complex of buildings and equipment for processing and storage of Solid Rocket Booster segments for Space Shuttle missions.

Site preparation is well under way by W & J Construction Company of Cocoa, under a \$7.2 million contract to provide the labor, equipment and materials for construction of the complex to include the Solid Rocket Booster Rotation/Processing Facility and two accompanying SRB Segment Storage Buildings.

According to Ernest Laitzenheiser, lead design engineer for the project, the facility, designed by Daniel, Mann, Johnson, Mendenhall of Los Angeles, is slated for completion 18 months after the official commencement date of May 20.

Nick Witek, vice president of the W & J company, said most of the preliminary work on the site, located north of the Vehicle Assembly Building, has been completed.

W & J is no stranger to KSC construction work. Approximately 18 months ago, Witek noted, the company won the \$6.7 million contract for modification of Launch Pad 39B for Space Shuttle use.

The firm has been located in the Cocoa area for 17 years, and has built commercial and industrial buildings, offices and churches, with an estimated 50 percent of its business involved with contracts with NASA and the U.S. Air Force.

Under the present SRB processing system, the live solid motor segments for the boosters are received, processed and inspected in the VAB. The aft skirts and aft propellant segments of the SRB's are also assembled there.

NASA spokesmen said moving these operations to a separate building will reduce hazardous conditions in the VAB.

The move also will avoid impacting the VAB's launch support capability by eliminating scheduling conflicts between hazardous work involving the SRB's and non-hazardous operations on the orbiter, external tank and assembled booster rockets.

Location of the SRB work in a separate facility, noted Project Engineer Alfredo Teran, also will allow efficient and economical handling of operations during normal working hours, concurrently with ongoing work in the VAB.

When completed, the new facilities will allow storage of two sets of SRB's, with capability to support more than 20 launches per year. (SPACEPORT NEWS, 8-19-82, p. 7, Vol. 21, No. 17)

<> "I felt like I won the Olympics," said Walter Bond, a former track star, after witnessing the fourth launch of the Space Shuttle Columbia, his first "in person" liftoff.

Bond is from Windsor, North Carolina, and is a senior honor student majoring in biology at North Carolina Central University.

Through the Minority Access to Research Careers/Honors Undergraduate Research Training Program of the National Institutes of Health, he is able to work for eight weeks this summer at KSC in the cardiovascular physiology laboratory. Dr. Mary Anne Frey, technical manager in charge of the biomedical research lab in the O & C Building, designs his work programs.

Bond performs chemical analysis, works in the stress lab, and works with lab technicians analyzing blood and blood serum.

As a student, he has a research obligation to fulfill. Students are required to complete an external research experience while involved at the university. To fulfill his requirements he is working with NASA on red blood cell degeneration and red blood cell count in athletes. Another aspect of the study is cardiac output, calculations and measurements.

Bond receives a one-hour credit toward his degree by doing research outside of NCCU. His goal is to obtain a doctorate in biomedical research.

He was recommended by his professors for the MARC program, Minority Access to Research Careers. The program pays for transportation, gives the students a monthly stipend plus a salary, and pays for fees and tuition the last year of their undergraduate education. In return, the student must maintain a 3.0 average and complete a required external research study.

Dr. John Ruffin, director of the MARC program at NCCU said, "The objective of the program is to educate and encourage the minority student to strive for a doctorate in the biomedical sciences."

"Kennedy Space Center is a fantastic site for students because it's not an academic setting. Walter is getting a meaningful experience because there are a number of activities going on here besides his own work," added Dr. Ruffin, who is also chairman of the Department of Biology at NCCU. (SPACEPORT NEWS, 8-19-82, p. 2, Vol. 21, No. 17)

August 22: The open cargo bay of the Space Shuttle might not be the ideal place for sophisticated cameras and telescopes as NASA engineers once thought. For the Air Force, which depends on such optical equipment in surveillance, the view from the Shuttle could be obscured by the spacecraft's own "pollution."

Preliminary findings from Columbia's third mission in March showed that rocket exhaust, water vapor and particles from the Shuttle's own exterior played havoc with an experiment designed to study the effects of space flight on optical equipment....

Dr. J. L. Weinberg [a University of Florida physicist] said it is premature to say whether these problems are insurmountable but "there will be quite a bit of work ahead of us." (TODAY, 8-22-82, pp. 1A & 16A)

<> Thousands of Kennedy Space Center employees and their families flocked to the center Sunday for its first open house in four years and heard Shuttle astronauts Thomas "Ken" Mattingly and Henry Hartsfield thank them for their successful seven-day mission.

Many in the crowd cheered the astronauts who completed Columbia's fourth and final test flight with a July 4 landing at Edwards Air Force Base in California.

"You can't imagine how much magic there is in that machine," Mattingly said of the Space Shuttle Columbia and its booster rockets.

"For seven days, we leaned on things to try to find problems for our reports, but we couldn't find any," he said of the mission. "When you read zero defects, it means, 'Made in the U.S.A.'"

Mattingly, who also flew on the Apollo 16 lunar mission, said, "I believe your performance is more professional now than during Apollo."

Hartsfield, whose wife Fran was in the audience, said, "It was the greatest experience in my life to float in that spacecraft."

"Only in America can you produce a machine like that," Hartsfield said. "It was the best ride I ever had. We didn't want to come home, and I'd go again today if there was a Shuttle stacked out there."

Speaking to youngsters seated on the ground before the platform placed in front of the Orbiter Processing Facility, Hartsfield added, "You children now will be able to do things in space that we can't even imagine."

Through the open doors of the OPF, the Orbiter Challenger could be seen behind the astronauts.

The two astronauts presented Kennedy Space Center Director Richard Smith with a flag and a patch from their mission mounted on a plaque. Smith, in return, gave them colorful photographs of their launch.

Employees and their families are allowed to tour a number of areas that normally are not open to the public, said KSC spokesman Hugh Harris. Besides seeing the Challenger, they were shown the European Spacelab, the firing room, some payload areas and laboratories. In addition, one of the 54-foot diameter parachutes that help break the solid-rocket boosters' fall to the ocean was on display.

Although final crowd estimates were not available Sunday night, an estimated 10,000 people passed through just one of the center's four gates.

Although employees enjoyed themselves Sunday, NASA is prepared to lay off 2,100 of them for up to 10 days if the U.S. Senate and President Reagan fail to approve a \$14.2 billion supplemental money request to help meet government expenses through the fiscal year's end September 30. The measure already has been approved by the House.

If layoffs occur, Harris said KSC would try to schedule them to cause the least possible effect on Columbia's next launch scheduled November 11. (TODAY, 8-23-82, p. 1A)

August 24: Columbia Boulevard will join the high-flying ranks of NASA and Apollo Boulevards this week as the latest Brevard thoroughfare named for the space program.

In a ceremony scheduled for Thursday, NASA and local elected officials will unveil a new road sign for a four-mile stretch of SR 405 renamed in honor of the Space Shuttle Columbia. Columbia Boulevard will run from SR 50 east to gate three of the Kennedy Space Center.

The idea to rename that portion of SR 405 was discussed by Brevard County commissioners earlier this year. During the last session of the state Legislature in March, the name change was introduced by state Sen. John Vogt, D-Cocoa Beach, and Clark Maxwell, Jr., R-Melbourne.

It passed easily in both houses, Vogt said. He called the new boulevard part of "local pride" in the space program and four successful Shuttle test flights.

Brevard already can claim an Astronaut Boulevard, Apollo Boulevard, NASA Boulevard, and schools named Apollo, Gemini, Freedom 7, Saturn and Astronaut. But Columbia Boulevard is the first public road dubbed for a Shuttle achievement. (TODAY, 8-24-82, p. 1B)

<> Astronaut Sally Ride, the first American women scheduled for a flight in space, tried her hand at firefighting at Kennedy Space Center Tuesday. Astronauts for the next three Shuttle mission started their emergency training Friday and Tuesday's class was the last. Ride will fly on the 7th mission set for April 1983 with Bob Crippen, Fred Hauck and John Fabian. (TODAY, 8-25-82, p. 10A)

August 25: They had more fun in the old days of rocketry.

Take the gang who tested rocket engines in a Bell Aircraft facility at Niagra Falls, N.Y., 30 years ago.

They'd put the Rascal and Hustler engines in the test firing stands, recalled NASA's Dr. Robert Gray, then in charge of rocket instrumentation activities at the Bell plant. He's now top Shuttle man at the Space Center.

"We used to keep score on rocket explosions," Rob told us, "to see who could blow the water-cooled nozzle the farthest across the fence into the Carborundum Corp. plant."

Nozzle weight: 300-400 pounds!

In those early days of rocket motor development, in the early '50s, "there were engine explosions sometimes several times a day, certainly several times a week," Bob said.

"Sometimes they were major."

A good-sized explosion would send the nozzle hurtling into Carborundum property, much to the dismay of that company's management and workers.

"They were very much displeased," Bob noted. Not only would Bell's neighbors be assailed by a massive piece of metal, but the explosions "blew windows out and set their coal pile on fire." (TODAY, 8-25-82, p. 1B)

August 27: Cocoa Beach may have the right location but apparently not at the right price.

The production company of "The Right Stuff" -- the film being born by the Tom Wolfe book about America's seven original astronauts -- decided Thursday that a \$100,000 price tag for shooting a film segment here was the wrong number.

In its on-again/off-again brush with stardom, the Cocoa Beach City Commission early Thursday evening had approved a request by the Ladd Co. to film one day along Minuteman Causeway. The written request from location manager Rory Enke said filming would start either Wednesday or Thursday.

Mayor Dave Brown and Commissioners Jack Kuritzky and Mary-Francis Vaughn, the three council members present at the 5 p.m. special meeting, quickly approved the request, then went on with a 90-minute budget workshop.

But at 7:25 p.m., Brown got a call at home from an apologetic Enke, who said the \$100,000 cost of moving actors and equipment from San Francisco to Cocoa Beach had killed the idea of filming in Florida. Brown said Enke told him the decision had just been made in a production meeting in California. (TODAY, 8-27-82, p. 1B)

<> NASA's newest high-powered rocket launched into space without a hitch at 7:10 p.m. Thursday from Cape Canaveral Air Force Station with a Canadian communications satellite perched on top.

The Anik D satellite should provide northern and western Canada with 24 color television channels when it goes into service by September 21. The \$30 million satellite was lifted into the upper reaches of the atmosphere at a speed of more than 12,000 miles an hour leaving a corkscrew of smoke in its wake.

The thundering fireball could be seen clearly as far as 12 miles up in cloudless skies. Nine small strap-on booster rockets gave the 116-foot-tall Delta launcher its initial kick from a newly refurbished launch pad.

Pad 17B was last used in 1979 and after an almost \$1.8 million face lift, the pad is ready to accommodate as many as 12 of the new Delta launches a year, said Charles Gay, director of Kennedy Space Center's rocket operations.

The new upgraded Delta rocket is capable of lifting 400 more pounds of satellite into orbit than its predecessor. And Thursday's textbook launch marks the lifting of the heaviest satellite ever by a Delta rocket, officials said.

The first launch of the upgraded Delta was made from Vandenberg Air Force Station, California, in July.

Although weather at the launch site appeared threatening about 5:30 p.m. Thursday, it cleared by liftoff, said Dick Young, NASA spokesman.

Anik D will circle the globe over Western Canada near Winnipeg and should be operating from a height of 22,000 miles, said officials of Telesat of Canada.

"Essentially Anik D will more than double satellite communications in Canada," said William Zatychec, director of Telesat's satellite division.

The satellite's lifetime is about nine years.

Originally set to launch August 19, liftoff was pushed back a week because of problems with electronic equipment on the pad. The electronics package, which controls ground support equipment, was repaired earlier this month. (TODAY, 8-27-82, p. 16A)

August 29: Cowhands are moving 3,000 cattle by barge to the mainland to allow a firm trying to become the first private space agency to finish preparations for its second attempted rocket launch.

The solid fuel rocket, Conestoga 1, is scheduled to blast off September 8 on a suborbital mission from the southern end of the island, /Matagorda, Texas/ site of last year's ill-fated launch.

The Minuteman rocket, purchased from the National Aeronautics and Space Administration, will be placed on a concrete block Tuesday and surrounded by a steel gantry, officials said. (TODAY, 8-29-82, p. 20A)

August 30: President Reagan does not have enough votes at this point to win a fight in Congress over his veto of a \$14.2 billion supplemental appropriations bill, a White House official said Sunday.

"We start from a position that we've started from many times before, and that's behind," said White House deputy press secretary Larry Speakes.

However, he said Reagan would do whatever is necessary to win a veto showdown that will take place when Congress returns from its vacation September 8.

Because of Reagan's veto of the bill, Kennedy Space Center would temporarily shut down if it is forced to lay off its 2,100 federal civil service workers because of a fund shortage, "but that's very unlikely," space center spokesman Hugh Harris said Friday.

About half of the work force at Johnson Space Center in Houston, or 3,400 workers, is employed under civil service law, and spokesman Steve Nesbitt said preparations for the Shuttle's fifth mission could not continue without them.

Astronauts who are not in the branches of the military are covered by civil service law.

Harris said officials at KSC have been "looking at plans to reduce the amount of time people would have to be laid off. It's a matter of determining - down to the last penny - how long we can continue to pay people and allow them to work."

If layoffs occur, Harris said, the space center will try to do it in such a way as to have the least possible effect on the Shuttle launch.

Officials at Patrick Air Force Base, with 3,000 military and 2,000 civil service personnel, said the overall impact - if any - could not yet be determined.

The key question is whether Republicans will stand with the president in this fight. (TODAY, 8-30-82, p. 3A)

<> U.S. Rep. Bill Nelson, the Melbourne Democrat whose district includes the space center, said he still was confident the layoffs could be avoided.

"We can put an acceptable bill together and have it ready for the president's signature by the middle of September," Nelson said.

"The only thing that could possibly get in the way would be if there were some significant showdown between Congress and the president over some other part of the bill," Nelson said.

The fiscal year of the federal government begins October 1. Funding as of that date has already been approved.

Funds for the space center are projected to run out on September 20. (THE ORLANDO SENTINEL, 8-30-82, p. A-9)

August 31: A Casselberry woman filed a negligence suit Monday against NASA, charging that a water fountain she drank from in 1980 at the Vehicle Assembly Building contained parasites that made her sick.

Cheryl Ann Burt and her husband, Larry, charged that NASA, Boeing Services International Inc. and its insurer, Aetna Life and Casualty Co.; and Rockwell International and its insurer, Traveler's Insurance Co., were negligent in maintaining the quality of drinking water at the space center. The suit, filed in U.S. District Court in Orlando, asks for an unspecified amount in damages.

Mrs. Burt, who worked as a messenger for Atlantic Technical Services, was delivering mail to a Rockwell office in the Vehicle Assembly Building on November 6, 1980, when she drank from a second-floor water fountain and later became sick, the suit says.

The suit charges that the water contained "giardia parasites," which it claims are dangerous to humans and often are found in contaminated water. It states that the woman became "seriously ill" and required hospitalization.

Burt's husband joined in the suit, charging that he has suffered from the loss of "services, companionship and comfort" of his spouse.

In a claim filed with NASA earlier this year, the woman charged that she lost weight and suffered permanent damage to her gastro-intestinal tract. The claim also states that she has been forced to take "toxic drugs" to combat the condition, which may result in "further complications."

A NASA spokesman was not available for comment, but NASA chief counsel Edward Parry denied the woman's injury claim earlier this month. Parry wrote in a letter August 2 that Burt's claim was a "product of mere speculation" with no proven link to NASA.

Rejection of the claim allowed Burt to take the case to federal court. (THE ORLANDO SENTINEL, 8-31-82)

SEPTEMBER 1982

September 1: United Space Boosters, an operating unit of United Technologies' Norden Systems subsidiary, has won an extension of its current contract to perform processing operations for the solid rocket boosters used on the Space Shuttle.

The contract extension is valued at \$12,604,000, bringing the cumulative value of the company's contract with the National Aeronautics and Space Administration to \$54,331,737. Under the contract, the company provides for receiving inspections of the booster segments, nozzle assemblies, nozzle extensions, and associated hardware. It also provides for assembly and checkout of the various parts of the booster through pre-launch, launch, post-launch, recovery and disassembly operations.

The cost plus award fee contract extension covers the period from April 1 through December 31, 1982. (NASA NEWS RELEASE NO. 198-82, 9-1-82)

September 2: A 37-foot-surplus military rocket is poised on a sandy Texas Island, ready for the first launch of a spacecraft by private enterprise, a Houston company announced Wednesday.

The solid-fueled rocket, named Conestoga 1, is scheduled to carry a dummy payload to 192 miles above the earth where it will eject a shower of ice crystals and then fall into the Gulf of Mexico.

Space Services Inc. of Houston is spending about \$2.5 million for the project. The company's chairman, David Hannah, said the firm plans to develop a launch system that can carry satellites into low earth orbit for commercial customers. (TODAY, 9-2-82, p. 12A)

<> It didn't take animal care specialists from Sea World long to decide what to name the injured manatee they rescued from Sykes Creek last May.

There was something about the expression on the gentle sea mammal's face...and the spunky 3-5 year old animal's spirit clinched it, said Sandra Garrett, animal information representative from Sea World. "We knew she'd be going home -- so it seemed natural to name her 'E.T.'"

E.T., injured when she tangled a flipper in a crab trap line, was transported to Sea World after Florida Marine Patrol officers called for assistance.

The 535-pound creature began eating right away, and with the help of daily treatments, overcame the deep cut she had suffered. After three months, she was ready to return to the lagoonal waters that are her natural habitat.

E.T., painlessly marked for future research on her movements, received a celebrity sendoff. Under the direction of Glenn Young, assistant curator of mammals and birds, she was taken in a special conveyance to KARS Park on the shore of the Banana River where a group of manatees have been sighted.

Witnessed by KSC Director Dick Smith and heavy representation by the news media, and assisted by Sea World personnel and U.S. Representative Bill Nelson who rolled up the legs of his trousers and helped hoist the seven-foot, four-inch animal into the water, the release of E.T. was accomplished on September 2.

When last seen, E.T., escorted by marine patrol craft that kept motorboats away from the area, was headed for open water. (SPACEPORT NEWS, 9-21-82, p. 6, Vol. 21, No. 19)

September 3: A management-initiated "lockout" of 225 security guards was averted at Kennedy Space Center Friday /Sept. 3/ when Wackenhut Security Inc. employees accepted a salary freeze for the next 15 months followed by a 5.7 percent pay increase.

In a letter to union representatives, Wackenhut officials threatened to refuse to allow the employees to work after 10 p.m. Friday unless the two sides reached an agreement.

The lockout would have been the first work stoppage forced by management at the government installation, said union President Al Scholar. (TODAY, 9-4-82, p. 1B)

September 4: A piece of a broken Shuttle booster rocket buried 3,500 feet beneath the Atlantic Ocean may see the light of day sometime this week, NASA officials said Saturday /Sept. 4/.

The 40-foot-long section of the left-hand rocket -- complete with two parachutes and flight recorders -- will be lifted from the sea with the help of a remote control salvaging device on a Navy vessel, NASA spokesman Rocky Raab said.

The Navy vessel and United Technologies Co.'s Freedom left Port Canaveral Friday for the site 150 miles out at sea. Freedom is a rocket retriever boat.

A camera, attached to a robot submarine called the SCARAB, will search the ocean floor for any other flight recorders that may have been buried under the rocket piece.

Raab said it will be several days before cables are attached to the 20-ton steel casing and it is slowly reeled up.

The booster rockets, which gave the Shuttle its initial lift into the upper atmosphere June 27, were supposed to be recovered after launch. But a failure in the parachute systems doomed the rockets to a watery grave in the Atlantic. (TODAY, 9-5-82, p. 20A)

September 7: NASA's John F. Kennedy Space Center has awarded a \$11,521,430 extension of a current contract to Martin Marietta Corporation, Denver, Colorado, to perform External Tank processing operations for the Space Shuttle. The cumulative value of the company's contract with the National Aeronautics and Space Administration to provide these services is \$54,322,823.

Under terms of the contract, Martin Marietta will provide for planning, control and performance activities which will ensure that the External Tank and associated support equipment will operate within specifications. Martin

Marietta will also provide engineering capability to implement facility and equipment modifications associated with the External Tank. The cost plus award fee contract covers the period from April 1 through December 31, 1982. (NASA NEWS RELEASE NO. 199-82, 9-7-82)

- <> The Defense and Systems Group of TRW, Incorporated, Redondo Beach, California, has been awarded an extension of a contract to provide spare parts for payload integrators and payload signal processors for the Space Shuttle. The parts will be manufactured at the TRW plant in Redondo Beach and in Colorado Springs, Colorado.

The contract totals \$1,614,000, bringing the cumulative value of the TRW contract to \$5,795,549. The cost plus fixed fee contract calls for the spare replacement units to be delivered to the Kennedy Space Center in August, 1984. (NASA NEWS RELEASE NO. 200-82, 9-7-82)

- <> Rockwell International Corporation's Space Systems Group of Kennedy Space Center, Florida, has won a \$94,667,400 extension to its Space Shuttle processing contract here.

The contract extension calls for Rockwell to perform normal processing functions to prepare the Space Shuttle Orbiter for launch at Kennedy Space Center. The work includes all aspects of preparation of the orbiters, their main engines and other hardware during pre-launch, launch and post-landing activities.

The cost plus award fee extension brings the total value of the existing contract to the sum of \$416,534,543. The contract has been in force since January 1, 1977, and this extension covers the period from March 31, 1982 through December 31, 1982. (NEWS RELEASE NO. 204-82, 9-7-82)

September 9: An 18-year-old biology student hopes to gain insight into the healing process in space when the shuttle Columbia carries 18 samples of Florida Gulf Coast sponges on its next mission in November.

For millions of years, tiny cells have easily assembled into healthy ocean sponges. In the weightlessness of space, that natural formation may be thwarted, the student, Aaron Gillette, believes. Mr. Gillette, who comes from Winter Haven, Florida, and is attending Western Carolina University, says that if that is the case, healing an astronaut's wound in flight may be equally difficult.

The small sponges, called porifera, will be disassembled into one-cell organisms before the launching November 11. Mr. Gillette said cameras would record any sponge formation. (THE NEW YORK TIMES, 9-9-82)

<> Claude Davis, an aerospace engineer at Kennedy Space Center, will be recommended to Governor Bob Graham for an appointment to the state Public Service Commission, the PSC Nominating Council decided Wednesday.

"My initial reaction is, I'm very pleased the nominating council thought I was qualified," said Davis, a Rockledge resident. "I feel I am the best person for the job on the PSC."

The council whittled a list of 68 applicants to eight finalists who will be interviewed for two vacancies on the commission. Six Brevard County residents were among the 60 applicants cut Wednesday.

Among those selected were Davis and two incumbent PSC members, Joe Cresse and Gerald Gunter, a former Titusville city councilman. Both are seeking reappointment to the PSC.

If he doesn't make it this time, Davis said, he'll try again: "It took Ronald Reagan 12 years to get to be president." (TODAY, 9-9-82, p. 2B)

<> The Space Shuttle Columbia starts the first 300 yards of its fifth mission at noon today with a tow from its hangar to the Vehicle Assembly Building.

In preparation, technicians at Kennedy Space Center changed one of the spacecraft's 44 1/2-inch tires Wednesday, said KSC spokesman Jim Ball. He said by midnight Wednesday the 122-foot-long Columbia was to be lowered on its landing gear.

From there the airplane-like Columbia is weighed to determine its center of gravity. That's necessary to check flight computer programs that depend on the center of gravity for guiding flight.

"We're ready to roll it (Columbia) out by noon but if they can go a little earlier, they will," Ball said.

Once the Columbia is in the 525-foot-high Vehicle Assembly Building it will be connected to two booster rockets and an empty fuel tank. By late September the fully assembled spacecraft will be moved to the launch pad for a November 11 launch.

The fifth Shuttle mission is dedicated to putting two communication satellites into orbit. (TODAY, 9-9-82, p. 14A)

September 10: Space Shuttle Columbia made a mad dash between rainstorms from its "barn" to the Vehicle Assembly Building Thursday afternoon. Along with the weather, a stuck VAB door pushed Columbia's first steps back almost a day.

Once inside the 525-foot-high assembly building by 5:20 p.m., Columbia was prepared for stacking with its two booster rockets and a peach-colored fuel tank. Workers began immediately to wrap a sling around Columbia's belly to hoist it into a vertical position. It will be lifted by a crane late today and bolted atop its mobile launch platform.

The full assembly of the Shuttle should be completed by Saturday and is scheduled to head to the launch pad September 21, said James Harrington, chief of Orbiter Operations at Kennedy Space Center.

Despite the minor problems Thursday, Harrington said Columbia should be ready to fly its fifth mission into space by November 11. On that mission, the spacecraft will carry four men and two communications satellites into orbit.

Columbia was in its hangar for 41 work days where engineers repaired all damaged heat protection tiles.

"This is the first time we've come over to the VAB with zero cavities," said Harrington, referring to the fact that tile work was completed in the hangar.

Challenger is currently being worked on in the same hangar Columbia left behind.

"The work on Challenger will pick up a bit now that Columbia's out of the barn," Harrington said. (TODAY, 9-10-82, p. 16A)

- <> NASA has called off plans to dredge a 40-foot-long section of a broken Space Shuttle booster rocket from the ocean's bottom.

The two rockets used to lift Columbia into the upper atmosphere, sank 3,500 feet in the Atlantic after the last launch in June. The rockets were supposed to float and be recovered, but parachutes failed. The rockets crashed to the sea 150 miles off the Brevard coast.

On September 4, a board investigating the failure recommended that rocket piece with its flight recorders be dredged with the help of a Navy vessel.

Underwater photographs taken since then have provided enough information about the failed parachutes, making it unnecessary to recover the recorders, NASA spokesman John Taylor said Thursday. (TODAY, 9-10-82, p. 16A)

- <> The first rocket by a private company planning to orbit satellites blasted off Thursday from Matagorda Island, Texas. It flew a 10 1/2-minute suborbital mission before splashing down in the Gulf of Mexico.

"Everything looked perfect. It went right on down the pike," said mission director Deke Slayton, a retired astronaut.

Conestoga I, a gleaming white, 37-foot-tall rocket, climbed to an altitude of 192 miles, arched over the Gulf and separated from a dummy payload that spewed 400 pounds of

water into space. The payload and rocket splashed down 321 miles from the launch pad.

The launch from the tiny coastal island by Space Services Incorporated of America was a "victory for private enterprise," said company founder and board chairman David Hannah, a Houston businessman.

"This showed that a group of private investors can get together and launch a rocket in a responsible way and well within a commercially feasible limit," said Hannah.

Hannah said a dozen oil companies have expressed interest in using SSI to place satellites in orbit to monitor oil wells in remote sites and to search for minerals and oil deposits.

SSI plans to build a multiple-stage rocket system capable of orbiting a 500-pound satellite about 500 miles above Earth.

Conestoga I was built around a solid-fuel rocket motor from a surplus Minuteman missile. SSI bought the motor from NASA for \$365,000 and hired a contractor, Space Vectors Incorporated, to build the spacecraft.

Next on SSI's agenda is launching a satellite and raising \$15 million to \$20 million to finance it, Hannah said. The company has yet to obtain a launch site but is negotiating for a location in Hawaii, he said. (TODAY, 9-10-82, p. 1A)

September 11: A record crowd poured into KARS Park on September 11 to picnic on chicken, beer, cola and ice cream and defy threatening rain clouds to make the NASA - Contractor Family Picnic and Fair the most successful ever.

While scattered showers seemed to soak everything in the vicinity except the park, 2,430 NASA and contractor executives and workers played games, vied for prizes and listened to music.

Picnickers played horseshoes, volleyball, softball, tennis and shuffleboard, swam and cheered for their favorite team in the Tug-O-War.

Arriving by car, boat, motorcycle and motor home, they cheered the youngsters in their events, including a sack race and a balloon stomp.

They did double takes when they belatedly realized that the guy who took their tickets or handed them an ice cream was a high-ranking NASA executive.

They lined up to send NASA's Henry Paul, Tom Wirth of Martin Marietta, Paul Donnelly of USBI, Al Reeser of Rockwell International and Bob Foster of CSC into the dunk tank. Former top-level officials Lee Scherer and Miles Ross joined Dick Smith and George Page in the festivities. The crowd was swelled by a contingent of European visitors in enthusiastically cheering on a soccer match, patronized fair booths until they ran out of prizes and applauded as the park's new "River Breeze Pavilion" was dedicated. (SPACEPORT NEWS, 9-17-82, pp. 4 & 5, Vol. 21, No. 19)

<> Kennedy Space Center workers Friday began the tedious process of mounting the space shuttle vertically atop its mobile launch platform in preparation for its fifth mission.

The 10-hour operation, which followed Thursday's rollout of the 100-ton orbiter to the Vehicle Assembly Building, began about 4 p.m. and was expected to be completed about 2 a.m. today, said spokesman Hugh Harris.

Once atop the mobile launch platform, Columbia will be mated to its external 15-story fuel tank and solid-fuel rockets. Its fifth mission -- the shuttle's first as a full-blown space ferry after four test flights -- is scheduled to begin November 11. (THE ORLANDO SENTINEL, 9-11-82)

September 13: It looked like something out of the Neiman-Marcus catalog, an outlandish toy for the Texan who has everything.

But the stubby rocket that thundered into space last week above a Texas cattle ranch may signal the start of a new era of commercial spaceflight.

"We feel we can offer a service that NASA cannot," said David Hannah, a Houston real estate developer who heads Space Services Inc., which sent the 36-foot Conestoga rocket 195 miles above Earth.

The David-and-Goliath challenge did not fall on deaf ears. Despite four successful space shuttle missions, NASA is struggling to overcome financial and scheduling problems with the \$17 billion shuttle program. Critics say the agency has become a bloated and arthritic bureaucracy since its glory days in the early 1960s.

"We don't have a big paper mill and a lot of people flopping around," said Deke Slayton, 58, a former Mercury astronaut who retired from NASA this year to join Space Services. "We all know what we're going to do and we do it."

A few high-ranking NASA officials have jumped ship to join the maverick Texas space program, which has only seven full-time employees.

Lee Scherer, who supervised 66 launches during his five years as the director of the Kennedy Space Center, said NASA has no more business launching rockets than it does running a commercial airline.

"The government should not be involved in anything that private enterprise can do," said Scherer, who was hired by Space Services to negotiate the lease of two Atlas-Centaur launch pads at Kennedy Space Center.

Despite their boastful bluster, Space Services officials are relying heavily on NASA support. Without a government surplus booster, bought for \$365,000 from NASA, Conestoga would still be earthbound.

But one successful flight isn't much of a track record, and some analysts doubt that Space Services could survive a second disaster. The company's effort to lease Atlas-Centaur launch pads from NASA stands a much greater chance of success.

General Dynamics also has expressed an interest in leasing the two pads at Kennedy Space Center, Mahon said. Because the two pads are on Air Force property and built with

taxpayers' money, it would take a "major policy statement" from the Reagan administration to approve such a lease, he said.

"It would be easy to just hand it all over, but intermingling private business and government would be rough," Mahon said. The space agency may form a task force to explore a possible rental arrangement, he said.

"The party line in NASA is that expendable rockets will be phased out and they've taken steps to make that happen," said Bonesteel, of General Dynamics. "Because of the uncertain situation of the shuttle program the phase-out has been delayed far into the future." (THE ORLANDO SENTINEL, 9-13-82, pp. 1A & 8A)

- <> Multibillion-dollar shuttle processing competition is in a critical phase as contractors attempt to align themselves into teams and the National Aeronautics and Space Administration completes what it hopes is a comprehensive request for proposals scheduled to be issued to the industry by the end of November.

The shuttle processing contract is intended to replace nearly two-dozen individual contracts, and to enable NASA to back away from day-to-day supervision of the processing cycle into what will essentially be an auditing role. A single contract is to be awarded, but the winner is expected to head a team consisting of some of the biggest aerospace companies in the U.S.

Assessments by potential bidders that observed space shuttle system processing for the third mission earlier this year divided into two divergent philosophies:

* Processing the space shuttle is a complex, technical operation that can be successful from mission and schedule standpoints only if done by the experienced element contractors until system maturity is assured.

* Processing the space shuttle is essentially a management task. The shuttle system is mature and design engineering is giving way to sustaining engineering.

The incumbent contractors -- Rockwell for the orbiter, Martin Marietta for the external tank and United Space Boosters for the solid rocket boosters -- subscribe to the first philosophy. Boeing, Lockheed and Grumman believe shuttle processing is a management task and that they are individually capable of taking over this job. (AVIATION WEEK & SPACE TECHNOLOGY, 9-13-82, p. 77, Vol. 117, No. 11)

September 15: Holloway Corporation, a Titusville construction company, has won a \$63,377 contract by NASA to provide the labor, equipment, and materials for the installation of Shuttle Inventory Management System II computer equipment in the central instrumentation facility at Kennedy Space Center. (TODAY, 9-15-82, p. 14C)

September 16: Jones Machine and Welding Shop of Merritt Island has been awarded a \$107,699 contract by NASA that is the result of a set - aside for a small business firm.

Under the terms of the fixed price contract, Jones Machine and Welding Shop will provide 36 hold-down bolts, which are approximately 4 feet long, 5 inches in diameter and weigh about 150 pounds. The hold-down bolts are expected to be delivered to the Kennedy Space Center in approximately five months. (NASA NEWS RELEASE NO. 207-82, 9-16-82)

September 17: Two astronauts will walk together in space for 3 1/2 hours during the space shuttle's mission in November, NASA officials said Thursday.

No American has walked in space since 1974, when astronaut Edward Gibson emptied film cassettes from a Skylab telescope.

An extra day was added to the Columbia's flight November 11-16 so mission specialists Joseph Allen and William Lenoir can put on 240-pound spacesuits, crawl through an air lock and tackle a few light chores in the shuttle's cargo bay.

"They've been assigned some make-work tasks with screwdrivers and wrenches, but mainly it's a test of the spacesuits," said Terry White, spokesman for Johnson Space Center in Houston.

The shuttle will carry two communications satellites and four crewmen during its fifth trip into space. The two satellites will be ejected from the shuttle by a spring-loaded turntable, then boosted into orbit by separate rocket stages.

The Columbia is scheduled to roll to its launch pad Tuesday.

Spacesuits worn by the shuttle astronauts are equipped with headlights, indoor plumbing, air conditioning and a supply of drinking water. The suits cost \$2 million each. Although astronaut Thomas Mattingly tried on a spacesuit during the fourth shuttle voyage in July, he did not leave the spacecraft.

During their spacewalk, Allen and Lenoir will be tethered to the shuttle by a safety cord. The 60-foot cargo bay also is equipped with hand and foot restraints so the astronauts can grope their way along the spaceship. The astronauts have spent dozens of hours submerged in underwater tanks at Johnson Space Center, testing the spacesuits to be used during their brief sojourn outside the shuttle.

SBS-C, a communications satellite owned by Satellite Business Systems, will be bounced from the shuttle on its first day in orbit. A second satellite, the Canadian-owned Anik-C, will be released on the second day.

NASA officials had been reluctant to schedule the spacewalk, fearing it might disrupt the satellite activity. "Everyone is pretty secure and confident about getting the satellites away and still do the spacewalk," White said.

The spacewalk will be a test of the astronauts' ability to tackle chores in space, including satellite repair and assembly of large structures in space. (THE ORLANDO SENTINEL, 9-17-82, p. A-1)

- <> A presentation of films, songs and dances has highlighted the observance of National Hispanic Week at KSC this week. Juan Rivera, a member of the Hispanic Employment Program Working Group that coordinated the activities, said, "One of our main purposes is to make Center employees aware of the involvement of Hispanics in the American culture and to create a community of people without prejudices because of race, ethnic origin or religion."

Rivera, an electronics engineer in the Experiment Processing Division, said Hispanic Heritage Week is also a good time to acquaint KSC employees with contributions Hispanic people have made to the space program and science and technology in general. "In this country," he said, "there is a tendency to look at Hispanics as foreigners. However, some of our ancestors were some of the earliest settlers here."

Currently there are 70 Hispanic federal employees at KSC, 58 male and 12 female. Of that number, 50 are engineers, and two of these are women.

In 1968 President /Johnson/ proclaimed the week which includes September 15 and 16 as National Hispanic Week in an effort to recognize Hispanic men and women who have played a vital role in the development and progress of this country. (SPACEPORT NEWS, 9-17-82, p. 2, Vol. 21, No. 19)

- <> Space Shuttle Columbia blasted off from Kennedy Space Center Thursday and began orbiting the Earth before a malfunction forced technicians to abort the mission and land the spaceplane in Southern California.

And it did all that without ever leaving the ground.

A simulated launch, single-orbit flight and touchdown - a computer-fooling dress rehearsal for Columbia's fifth mission November 11 -- provided technicians with a chance to test the Shuttle's sophisticated computers in a mission-like situation Thursday.

Two of the four STS-5 astronauts, Mission Cmdr. Vance Brand and pilot Robert Overmyer, were aboard the Shuttle for the simulated liftoff and 1-hour, 45-minute mock flight.

"Everything was successful; I'm very pleased with the test," launch director Al O'Hara said minutes after the coverall-attired astronauts climbed from the Orbiter at the space center.

The elaborate exercise also tested the Orbiter's ability to successfully abort its flight during the first phase of the mission from launch until the craft is out of the Earth's atmosphere.

Thursday's exercise was the last major series of tests on the Shuttle before Tuesday's scheduled rollout from the Vehicle Assembly Building to the launchpad.

After going through the motions of a final countdown and liftoff, the astronauts were confronted with a simulated malfunction and were forced to abort the mock mission before one orbit was completed, NASA spokesman Jim Ball said. Astronauts then pretended to land the spaceplane at Edwards Air Force Base, California.

A 10-hour countdown preceded the astronauts' 1:45 p.m. entry into the Orbiter, but a slower-than-anticipated series of programming commands delayed the scheduled 2 p.m. liftoff for an hour, officials said.

The test concluded at 4:45 p.m., O'Hara said.

The Shuttle "interface" test, which takes nearly a week, is designed to check critical electrical connections between Columbia, its external propellant tank and twin booster rockets. Final launch preparations will be conducted once Columbia is moved to Pad 39A. (TODAY, 9-17-82, p. 20A)

<> "Dee is one of those people who performs his job enthusiastically, but quietly," said Clem DiLoreto, manager of project engineering for Martin Marietta's External Tank Operations.

DiLoreto was referring to Dee Trimble, ET Operations employee of the month for August, and hardware project engineer for the group.

Trimble has been a key member in managing Martin Marietta procedure developments for all Shuttle launches. His efforts have extended into all fringe-related areas involving approval and control of engineering paper.

"Dee prevents a lot of problems through upfront effort," praised DiLoreto. "He doesn't just react to a problem. He attempts to influence the situation before it becomes a problem."

Trimble's response to NASA requirements and requests draws high praise from all who work with him.

He joined Martin Marietta with the Skylab program in 1972, and has been a member of the ET team since 1976. He and his wife Judy have five children and live in Rockledge.
(SPACEPORT NEWS, 9-17-82, p. 6, Vol. 21, No. 19)

<> About 100 national delegates and representatives of NATO's Advisory Group for Aerospace Research and Development (AGARD) recently toured the space center as the concluding activity of their annual meeting.

The group's tour on September 17 included a viewing of the assembled STS-5 Space Shuttle, the orbiter Challenger, and the European-built Spacelab.

After being welcomed to KSC by Center Director Dick Smith and Col. Marvin Jones, commander of the Eastern Space and Missile Center, AGARD delegates and representatives received Space Shuttle briefings from Mission Specialist Astronaut, Dr. James van Hoftien and KSC's Sam Beddingfield.

The advisory group, which meets each year in a different member nation, was hosted this year by the United States.

The advisory group provides NATO member nations with an organization for scientific and technical exchanges and assistance in the aerospace field. (SPACEPORT NEWS, 10-1-82, p. 2, Vol. 21, No. 20)

<> Richard G. Smith, Director
John F. Kennedy Space Center
Florida 32899

Dear Dick:

Lifetimes are filled with memories, and KSC has certainly provided some of our most pleasant and vivid ones. Your hospitality Sunday was one of those events we will savor for a long time. We thoroughly enjoyed our visit and appreciated your making it possible.

There is never enough time to say all the things we'd like to, or adequate opportunity to personally convey our thoughts to the people who make things happen. We have had the privilege of being involved in the Shuttle program from the day we put our dream onto paper through the completion of the flight demonstration program. Throughout this period we have been impressed with the total dedication and perserverance of the entire NASA-contractor team. We have been particularly proud of using the KSC story as our example as we try to tell the nation how all of this magic happens. We didn't achieve an operational Shuttle after only four flights because of computers, exotic materials or elegant design but rather because thousands of Americans made a personal commitment that it won't fail because of me. This attitude can continually be seen at KSC.

Please convey our professional respect to all of your team and our sincere thanks for allowing us to be a part of your team for that short piece of history called STS-4.

Sincerely,

T.K. Mattingly
STS-4 Commander

Henry W. Hartsfield, Jr.
STS-4 Pilot

- <> NASA's John F. Kennedy Space Center has awarded a contract to a small business in Lakeland, Florida, Specialty Maintenance and Construction, Inc., valued at \$318,557. The award provides for Specialty Maintenance and Construction to perform fabrication and assembly of a multiuse mission support equipment payload handling fixture to be used in support of the Space Shuttle.

This payload handling fixture will be the first of its kind ever built. It will be an invaluable tool if a Space Shuttle orbiter is ever forced to land at a contingency landing site. The fixture will be equipped to facilitate the removal of payloads from the orbiter if such a situation should occur. The fixture will be a portable device divided into seven segments for easy transport. These sections can be flown via C-5 aircraft whenever needed and assembled on-site. When assembled, the payload handling fixture will weigh 70 tons, and measure approximately 70 feet long, 20 feet wide, and 18 feet tall. Once assembled, the device will roll on truck bogie wheels and be towed to the orbiter, where the payloads can be removed and transferred to the payload handling fixture.

The fixed price contract provides for the payload handling fixture to be delivered to the Kennedy Space Center early in 1983. It will be shipped to the Kennedy Space Center by truck, and will go to the Launch Equipment Test Facility. At that time, the segments will be assembled, placed on truck bogies and towed to a mock retrieval site to test its performance capabilities, with and without a test load. (NASA NEWS RELEASE NO. 213-82, 9-20-82)

September 21: The first European who will fly in an American spacecraft had a bottle of champagne to celebrate his selection as a crewmember for Spacelab.

West German Dr. Ulf Merbold has a year to drink it - he'll be flying inside the Space Shuttle's portable Spacelab in September 1983.

Merbold and Byron Lichtenberg of the Massachusetts Institute of Technology were named Monday as the men who will operate as many as 36 scientific experiments inside the 23-foot-long barrel called Spacelab, tucked in the Shuttle's cargo bay. Both men are scientists and are the first non-astronauts chosen for space flight.

Lichtenberg's specialty is the study of space sickness, and he theorized that nausea and disorientation in zero gravity is caused by confusion of inner ear organs that help maintain an upright posture. He may test his notions by floating free inside Spacelab while cameras record eye movements and body sensations.

The men also will draw blood from each other during the seven-day flight. Blood samples from space will be compared with samples taken before the flight to check the influence of weightlessness on infection-fighting white blood cells.

Even as well-rounded scientists, Merbold and Lichtenberg will have responsibility for experiments outside their fields, including a measurement of cosmic radiation inside Spacelab and the study of the chemical composition of the upper atmosphere. Many of these experiments will operate automatically, Merbold said.

Lichtenberg, 34, and Merbold, 41, were chosen from a field of four - two Americans and two Europeans. The other two

men, Michael Lampton of the University of California and Wubbo Ockels of the Netherlands, will serve as backup crew. The international team of scientists sponsoring the Spacelab experiments made the selections.

"There were no tests. We've all had the same amount of training, and I understand the vote was close," said Lichtenberg, adding a familiarity with a broad number of the experiments was an important factor.

Merbold, who is a physicist with the Max-Planck Institute for Metals Research in Stuttgart, predicted the success of Spacelab will "encourage Europeans to continue in the manned space program."

Said Lichtenberg, joking about the international flavor of the Spacelab mission, "The computers are French and the beverages are from Texas. We'd like to get that reversed."

The \$1 billion Spacelab, which was delivered in a U.S. Air Force C-5 transport to Kennedy Space Center last December, is almost fully assembled, said Harry Craft, NASA's manager for the Spacelab mission.

When Lichtenberg and Merbold fly in Spacelab during the ninth Shuttle mission they will be joined by four others: Shuttle astronauts John Young and Brewster Shaw and mission specialists Owen Garriott and Robert Parker. (TODAY, 9-21-82, pp. 1A & 10A)

September 22: With only one of its 32,000 heat protection tiles missing, the fully assembled Space Shuttle Columbia rolled from its hangar to the launch pad without a fumble Tuesday. The spacecraft's next move is a thundering launch into orbit between 7:19 and 7:59 a.m. November 11.

NASA officials also announced the Columbia will not stay in California after this mission as earlier planned, but will be returned to Kennedy Space Center for six months of modifications in preparation for its next flight in September 1983.

The space agency previously had considered towing the Columbia to its manufacturer in Palmdale, California, after it lands at Edwards Air Force Base November 16.

But by flying the Columbia on the back of a 747 aircraft to KSC, engineers at Palmdale will have more time to finish construction of the third Shuttle Orbiter -- Discovery, said Al O'Hara, Shuttle launch director. Discovery is scheduled for delivery to KSC late next year and a first flight in March 1984.

O'Hara said the bulk of Columbia's modifications after this flight are to prepare the spacecraft for a 23-foot-long, barrel-shaped Spacelab that will fit inside its cargo bay. Two scientists will conduct experiments for a week inside Spacelab on the ninth Shuttle mission.

On Tuesday, the Columbia, bolted to its two booster rockets and empty fuel tank, began its 3 1/2 mile march from the Vehicle Assembly Building at 5:14 a.m. and by 12:15 p.m. it was secured to the launch pad.

"We rolled out this morning with one (heat protection) tile left to be bonded at the pad -- so that was sort of a record for us," O'Hara said.

A total of 273 tiles were removed from the Columbia's skin after the last mission, and 170 of them were damaged from flight. (TODAY, 9-22-82, p. 16A)

September 23: An international communications satellite atop a 134-foot rocket at Cape Canaveral Air Force Station will not be launched today as planned. Engineers suspect an internal power supply could fail once the satellite is in space.

INTELSAT V was supposed to lift off from the pad at 7:07 tonight but mechanical problems detected in a similar satellite under construction in California gave engineers second thoughts. No decision has been made on a new launch date, said NASA spokesman Hugh Harris.

Engineers last weekend found problems in an unfinished satellite at Palo Alto, California, and decided late

Wednesday to study the power supply in the satellite poised for launch here, said Allen McCaskill, manager of INTELSAT launch operations.

The power supply in question is used to operate an electronics package that turns the satellite's 51-foot-long solar wings toward the sun. Without that maneuver, the satellite would not be able to collect solar energy for power in orbit during the seven years of its life.

Harris said if the power supply problem is found in the satellite sitting on the pad, it may have to be removed from the top of its 13-story Atlas Centaur rocket. Engineers would have to replace the failed parts, he said, noting he couldn't estimate the cost of replacing any failed satellite parts.

The \$35 million INTELSAT V is owned by 105 nations.

The 4,348-pound satellite is the fifth of a new series of nine satellites linking telephone lines between borders. This latest satellite, with maritime communications, would be the first to provide telephone service to ships at sea and offshore drilling platforms from ground stations. McCaskill said 37 countries would use the maritime channels.

INTELSAT V is designed to circle the globe in time with the Earth's rotation at 22,000 miles up.

In keeping with the international character of the project, INTELSAT satellites are built by Ford Aerospace in Palo Alto using components developed by firms in England, Japan, Germany and France. (TODAY, 9-23-82, p. 14A)

September 24: The launch of an Intelsat V-E communications satellite which was postponed Thursday, has been rescheduled for Tuesday night, NASA announced.

The five-day delay will give technicians more time to study problems with a duplicate satellite at a Ford Aerospace and Communications Corp. plant in Palo Alto, California.

Intelsat V-E is the fifth in a series of nine communications satellites owned by the 105-nation International Telecommunications Satellite Organization. The satellite and its two-stage Atlas-Centaur rocket are valued at \$76 million. (THE ORLANDO SENTINEL, 9-24-82, p. B-2)

- <> By signing on the dotted line, an executive of the National Park Service has guaranteed a serious study of alternate access to Playalinda Beach and ended a year of bitter controversy.

More than a year after its first release, the park service's southeast regional director, Bob Baker, formally approved a 10-year master plan for the Canaveral National Seashore last week.

The year long delay came when the Save Our Beach citizens group protested that it made no mention of future access to Playalinda Beach.

That future has been placed in jeopardy by increasing security requirements for the Space Shuttle program. The only access road, SR 402, lies within the 3-mile security perimeter of Launch Pad 39A, from which shuttles now are being launched.

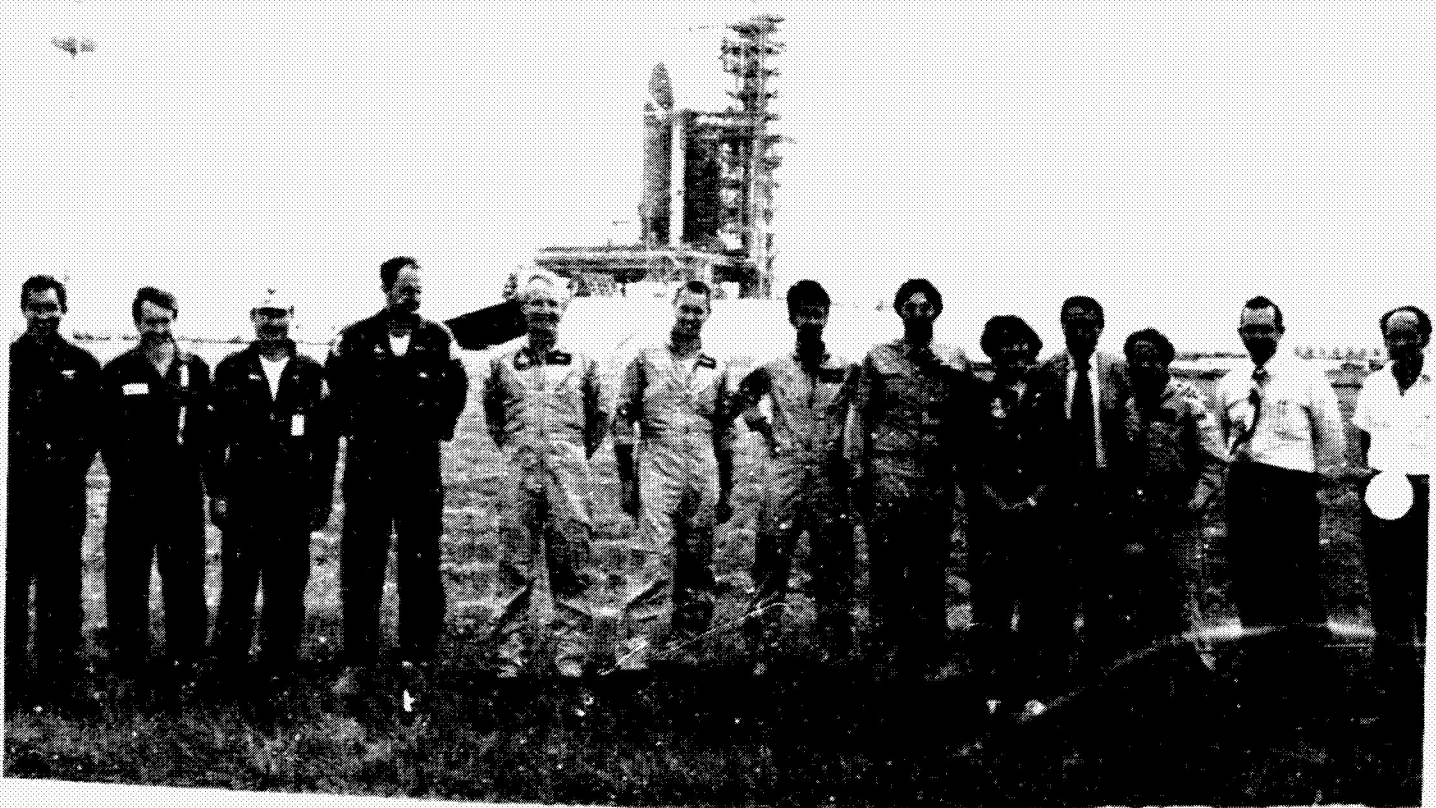
Although beachgoers have been allowed to travel through the security zone most of the time the Shuttle has sat on the pad, they have been barred about six days before each launch.

Despite satisfaction with those limited closures, SOB leaders expressed concern about more frequent closures when Launch Pad 39B goes into use in 1986. Pad 39B lies within one mile of the beach road and NASA officials say they can't allow the public to get that close.

The SOB members took their complaints - and 5,500 petition signatures - to Baker at his Atlanta office in January. After months of debate, park service officials and SOB members agreed to a compromise in August.

Although they say they can't guarantee constant access to the beach, park service officials agreed to spend \$100,000

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OF POOR QUALITY



STS-5 Astronaut Activities during CDDT.

on an alternate access study - to be conducted by a local firm - and finish it by next summer if there are no budget problems.

Park service officials also promised that the public will be asked its opinion on alternate access and that Titusville Mayor Truman Scarborough will be kept up to date on all matters concerning Playalinda Beach. (TODAY, 9-24-82, p. 1B)

September 27: Poets, painters and journalists may be shipping out aboard the space shuttle by the late 1980s.

NASA has appointed a task force to decide who should get passenger seats aboard the \$10 billion spaceship. Writers and artists probably stand the best chance of hitching a ride.

"You want someone who can translate the thrill and elation into words so hundreds of millions can understand what it's all about," said James Kukowski, a spokesman for NASA headquarters in Washington.

Although 79 American astronauts have tried to describe the wonders of space flight, the results have been less than lyrical....

The NASA task force will meet next month at Johnson Space Center in Houston, and will submit a final report in February. The group is studying medical and training requirements for passengers, and possible legal problems if they were to die in a shuttle disaster.

"The biggest problem is who's going to be number one," said Kukowski. "Once it's started, it's going to be pretty hard to stop."

Shuttle passengers would probably have to pass the same physical tests taken by mission specialists. The exam requires at least 20/100 uncorrected vision, hearing loss not to exceed 35 decibels, and blood pressure no higher than 140 over 90.

Passengers will have to be between 60 and 70 inches tall. There is no strict weight or age limit, but candidates who were overweight or over 60 probably won't be accepted, Kukowski said.

Riding on the shuttle isn't nearly as strenuous as on early space shots. The G-force during launch and landing is no worse than an average roller coaster. Space sickness - the dizzying nausea induced by weightlessness -- would probably be the worst ordeal, Kukowski said. (THE ORLANDO SENTINEL, 9-27-82, pp. A-1 & A-6)

September 28: Kennedy Space Center workers Monday readied the shuttle Columbia for the next major test for its first operational flight on November 11 -- the loading of supercold fuel into the orbiter's external tank. A space agency spokesman said more than 500,000 gallons of frigid liquid hydrogen and oxygen propellant was scheduled to begin flowing about 5 a.m. today. After the fueling and a mock countdown and simulated blastoff, the propellants will be drained out of the tank and stored until reloading about five hours before the flight. (THE ORLANDO SENTINEL, 9-28-82, p. B-2)

<> A satellite that will provide international maritime communications thundered from its Cape Canaveral Air Force Station launch pad Tuesday night.

Workers on offshore oil rigs will get their telephone messages through the satellite -- INTELSAT 5 -- once it becomes operational in December, said Cavin Trevitt, spokesman for INTELSAT, an international satellite company.

The satellite is owned by 105 nations scattered on every continent, with users from Monaco to Vietnam.

The \$35 million satellite climbed through the clouds aboard a 134-foot-high Atlas Centaur rocket at 7:08 p.m.

The 4,348-pound satellite is the fifth of a new series of nine satellites linking telephone lines between borders. This latest satellite is the first to provide telephone service to commercial ships at sea and offshore drilling platforms from ground stations.

The maritime channels will be used by 37 countries.

"Everything from tuna boats to oil rigs will use it," Trevitt said. Aside from the maritime communications, the satellite will be capable of transmitting 12,000 international telephone calls and two television stations. (TODAY, 9-29-82, p. 14A)

September 29: Among thousands of requests for passenger seats America's Space Shuttle is one offering to exchange photos of Unidentified Flying Objects for guaranteed reservations.

The proposal came from two New Jersey men, who wrote officials at Kennedy Space Center that they would turn the pictures over to the Soviet Union unless the space agency took them up on the offer.

"It's quite a pitch, but I'm afraid we're going to have to turn them down," KSC spokesman Rocky Raab said laughing.

"I'll just send them the standard reply" which says there are no immediate plans to take civilians on round-trip rides aboard the space plane, he added....(TODAY, 9-29-82, p. 14A)

<> Primed with a half-million gallons of frigid rocket fuel, space shuttle Columbia staged a successful mock liftoff Tuesday.

An inspection team found no trace of frost or ice on the 154-foot external fuel tank. Falling ice was blamed for damage to several heat shield tiles on the shuttle during the third launch in March.

The Columbia is scheduled to blast off again November 11, carrying four astronauts and two communications satellites on its fifth trip into orbit.

Shuttle commander Vance Brand, pilot Robert Overmyer and mission specialists Joseph Allen and William Lenoir will fly the five-day mission. None of the men were in the shuttle during Tuesday's test.

Loading of the supercold liquid hydrogen and liquid oxygen began at 4:50 a.m. The fuel was drained soon after the simulated blastoff at 11:02 a.m. (THE ORLANDO SENTINEL, 9-29-82, p. B-2)

September 30: The Reagan administration plans to increase the budget for the military use of space by 10 percent a year to \$11 billion annually by 1987, a Defense Department official said Wednesday.

The official, who asked not to be identified, said the annual increases would support a projection by Edward Aldridge, undersecretary of the Air Force, that the government will be spending \$14 billion by 1988 on military space programs.

The increases reflect the administration's announced plan to give the 24-year-old space program a military orientation.

President Reagan announced in July a new policy committing his administration to preparing for military combat in space and the development of an anti-satellite weapon.

But most of the increases are going to the Space Shuttle, the primary vehicle for putting defense payloads in orbit, and expanding the network of 40 military satellites now in place for mapping, communications, navigation, spying and gathering weather data.

The administration budgeted \$6.4 billion for the Defense Department's space program this year and is seeking \$8.5 billion for fiscal 1983. By comparison, NASA's annual budget is now \$5.5 billion with \$6.1 billion sought for it next year. (TODAY, 9-30-82, p. 20A)

<> Former astronaut Jack Swigert said Wednesday he is being treated for bone cancer but will continue his campaign for a seat in the U.S. House.

"Apollo 13 taught me that challenges are to be met and overcome," Swigert said at a press conference with his physician, Dr. Bob Sawyer.

Sawyer said that Swigert had undergone surgery for a malignant tumor in his nasal passage several months ago. He said that the test for the bone cancer had been one of the last tests done when the astronaut entered a hospital last week for back problems.

More tests are being done to determine whether there is a link between the two malignancies, the doctor said.

Swigert entered Presbyterian Hospital in Denver for tests to determine the cause of back pain on September 16, two days after he won the Republican nomination in the new 6th Congressional District.

The doctor said Swigert has tolerated treatments so well he can continue his campaign for Congress against Democrat Steve Hogan of Aurora. Sawyer said Swigert will undergo drug therapy every three or four weeks and should not have any significant ill effects from it.

Asked about Swigert's prognosis, Sawyer said, "His chances are better than getting back from the moon in a broken spaceship. They are better than a flip of the coin."

Swigert said the reason he is continuing his campaign "is the optimism expressed by my doctors in the ability to control the cancer, and their judgment that I would be fully able to serve the citizens of the 6th District as their representative." (THE ORLANDO SENTINEL, 9-30-82, p. A-5)

<> It's not one of the more glamorous pieces of hardware in the space business, but the entire Space Shuttle rests on the broad back of a hulking, battleship-gray structure known simply as the mobile launcher platform.

Last week, as technicians were busy stacking solid rocket segments for the sixth shuttle flight, a group of NASA and industry workers took a little time to celebrate completion of a five-year project to convert one of the Apollo-era rocket perches for operational shuttle use.

The second mobile launcher platform, MLP No. 2, was formally turned over on September 30 to KSC's Vehicles Operation Directorate for operational use in the shuttle program. It will serve as the base from which Orbiter Challenger will begin its first orbital flight early next year.

Since 1977, the Design Engineering Directorate has been managing the extensive modifications required before the Saturn-era MLP could be used with the new, reusable Space Shuttle system.

"Everybody feels very good about it," said DE's Dave Wentworth, project engineer on MLP-2. "Everybody worked very hard on this and we're glad to see the task completed."

The project to convert the mobile launcher platform began in 1977. Work was underway on the first MLP, later to serve as the launcher platform for the initial shuttle flights.

Major tasks included removal of the Saturn-Apollo launch umbilical tower, reconfiguration from one to three exhaust vents and strengthening of the deck and remodeling of MLP systems. During most of the past year, work has centered on equipment hookup, checkout and validation, Wentworth said. Total project cost was about \$40 million.

MLP-2 is essentially identical to the first mobile launcher platform put into shuttle service. Modifications made to MLP-1 to resolve a solid rocket booster overpressure problem have been incorporated on MLP-2.

While the crews involved in readying MLP-2 for shuttle service are glad to see their work accomplished, the job of converting Apollo launch platforms for shuttle operations is not over yet.

Wentworth said work, aimed at completion in 1986, will begin shortly on modifications to MLP-3, which rests in a parking lot north of the VAB. (SPACEPORT NEWS, 10-15-82, p. 2, Vol. 21, NO. 21)

<> Just think: a rocket was launched into space, and you didn't pay for it. Space Services Inc. of America -- a Texas firm with only seven employees -- did it with a mere

\$6 million of investors' money. The company hopes to provide "low-cost, market-oriented" services with future operations. The Soviet Union and some Third World regimes have let it be known they don't like the idea of private space programs. Then again, they don't like the idea of private earth programs. (NATIONAL REVIEW, 10-1-82, p. 1189, Vol. XXXIV, No. 19)

OCTOBER 1982

October 1: KSC's Federal Women's Program Manager has been detailed to NASA Headquarters in Washington, D.C. to serve for four months as manager of the NASA-wide FWP.

Pat Lowry, manager of the KSC program since 1977, will be in the nation's capital from October 3 through January 20, 1983. "This is an opportunity for people in the field to understand how the equal opportunity staff operates at the Headquarters level," she said. "It's a great learning situation and a challenge for me."

Lowry will occupy the office immediately following completion of a four-month term by the FWP manager from Johnson Space Center. The Headquarters-level position, currently vacant, and the program manager in the field centers are intended to enhance opportunities for women in NASA. (SPACEPORT NEWS, 10-1-82, p. 6, Vol. 21, No. 20)

<> NASA's John F. Kennedy Space Center has awarded a \$1,742,850 extension of a current contract to the Federal Systems Division of International Business Machines Corporation, Owego, N.Y., to support the Space Shuttle program. The contract calls for IBM to manufacture and deliver one general purpose computer system for support of the Air Force Orbiter Functional Simulator at Cape Canaveral Air Force Station, by May 1, 1984. The cumulative value of the company's fixed-fee contract with the National Aeronautics and Space Administration to provide these services is \$2,114,091. (NASA NEWS RELEASE NO. 219-82, 10-1-82)

<> Kennedy Space Center firefighters avoided a strike late Thursday by extending the current contract with their employer Wackenhut Services Inc.

Union members approved the measure less than one hour prior to Thursday's midnight strike deadline.

The Transport Workers Union, representing 86 firefighters, inspectors and truck drivers, reached a stalemate Thursday afternoon after negotiating since August 16, said Frank O'Connell, Transport Workers Union international vice president.

At issue is Wackenhut's proposal to combine the firefighters' duties with that of the medical corps personnel in the event Wackenhut is named as the space center's chief base operations contractor later this month.

While union leaders are not fighting the base contract, they believe Wackenhut's proposed combination of firefighters and emergency medical technicians is going to cut jobs as well as costs.

However, union members voted "overwhelmingly" to extend their current contract until 15 days after NASA officially names the space center's new base operations contractor, O'Connell said.

During that 15-day period, Wackenhut and union representatives will meet to negotiate a new contract, which will be retroactive to October 1, he said.

"We must have a new contract at the end of that period," he added.

Federal mediator Richard Deem was called into negotiations Wednesday and Thursday. He said the union and Wackenhut are negotiating for a 27-month agreement.

Wackenhut officials could not be reached for comment Thursday night.

NASA officials had said they did not anticipate any delay in the November 11 launch of the Space Shuttle in the event of a strike.

"We would expect Wackenhut to step right in and do the job," said KSC spokesman Mark Hess. (TODAY, 10-1-82, p. 1B)

<> Funding for a fifth space shuttle orbiter was approved Wednesday by congressional conferees working on the 1983 federal budget, but the unnamed spaceship remained in limbo.

In Washington, the House-Senate authorization committee included \$85 million in start-up money for the \$1 billion orbiter. But a joint appropriations conference committee, meeting the same day, included no funds for the project.

The split decision left NASA officials bewildered but optimistic.

"It'll be a while yet before it's sorted out," said Philip Culbertson, NASA associate deputy administrator. "There's a reasonable possibility that we can get the fifth shuttle both authorized and appropriated."

To begin work on a fifth orbiter, NASA will have to shift money from its 1983 budget, or submit a supplemental request next year. Either way, it will require approval from the White House and Congress.

The battle for a fifth shuttle has dragged on for years in Washington. NASA and the Department of Defense say a fifth shuttle is needed as insurance in case the fleet suffers a breakdown or crash. The space agency also expects a big increase in demand for shuttle space after 1987.

Only four shuttles -- Columbia, Challenger, Discovery and Atlantis -- have been funded.

Challenger is scheduled to fly for the first time in January. Discovery and Atlantis will be turned over to NASA in September 1983 and December 1984.

"If we have a total inventory of four and one goes down, the remaining three cannot carry the workload," Culbertson said.

Unless work begins soon on a fifth shuttle, many shuttle contractors will halt production and shut down assembly lines. Resuming shuttle construction at a later date could drive the price up by hundreds of millions of dollars, NASA officials warn.

A private firm, Space Transportation Co. of Princeton, N.J., wants to pay for the fifth shuttle orbiter in exchange for marketing rights for the entire shuttle fleet. NASA will meet with the group this month, and is expected to pass judgment on the proposal by December.

If the plan is approved, Rockwell International might begin building the fifth orbiter sometime next year. The fifth ship, still unnamed, probably wouldn't be finished until late 1986.

Spacetrans employs only nine full-time employees, but will hire 60 to 100 workers by 1987 if NASA approves the proposal. A battery of insurance companies, banks and other financial firms will provide cash to buy the \$1 billion orbiter.

Meanwhile, NASA is in the strange position of trying to win government funding for a fifth orbiter, and also negotiating with private industry to buy the spaceship. Although the congressional action Wednesday did not ensure funding, space officials viewed it as a vote of support.

"We have not been told by Congress that we can start cutting metal, but having it authorized is a clear, favorable action," Culbertson said. (THE ORLANDO SENTINEL, 10-1-82, pp. C-1 & C-6)

October 2: The House approved and sent to President Reagan Friday night a bill authorizing nearly \$6.8 billion in the new fiscal year for NASA.

The measure, which cleared the Senate on Thursday, passed the House 284-83. It includes about \$3.5 billion for research and development and construction of facilities for the Space Shuttle, which recently completed its operational test flights.

It also earmarks \$85 million to begin construction of a fifth Shuttle vehicle and instructs the space agency to charge the Defense Department "such prices as necessary to recover the fair value" of launching military payloads. (TODAY, 10-2-82, p. 12A)

October 5: Robinson Equipment Company of Mims, a small business firm, has been awarded a contract by NASA valued at \$27,788.

The fixed-price contract calls for Robinson Equipment to deliver two Massey-Ferguson Model 275 tractors to the Kennedy Space Center by October 23, 1982.

The tractors will replace similar ones which have outlived their usefulness. They will be used for general grounds maintenance at the Kennedy Space Center. (NASA NEWS RELEASE NO. 222-82, 10-5-82)

<> Highly combustible chemicals that will power the Shuttle Columbia through space are to be loaded this afternoon as the spacecraft sits on its Kennedy Space Center launch pad.

Monomethyl hydrazine and nitrogen tetroxide are a volatile combination that fuel the Columbia's rear maneuvering engines and an array of small steering thrusters in the front and rear.

The propellants provide the necessary push for positioning the 122-foot-long spacecraft during flight and bringing it out of orbit at the end of the mission.

The Shuttle's fifth mission is still scheduled to start the morning of November 11.

Loading the chemicals is a four-day operation and all but essential personnel are cleared from the launch pad area.

The fuel loading requires the installation of protective bibs and buckets to prevent any chemicals from spilling down the side of the fragile spacecraft.

Playalinda Beach will remain open to the public during the operation. (TODAY, 10-5-82, p. 10A)

October 7: Space experts hope to launch interested Brevard students on careers in science or engineering through a new four-year program that will involve them in the front lines of the nation's space exploration activities.

NASA's Unique Resident Tutoring for Up-and-Coming Replacement Engineers--NURTURE--is ultimately an attempt to encourage young people, particularly women and minorities, to aim for a job at the space center, said J.A. Diggs, director of the KSC Equal Opportunity Program Office.

If approved by the school board next week, the Nurture project in January would recruit 20 ninth-graders to study NASA programs and learn about potential engineering-related careers.

Although details haven't been worked out, the plan is for students, accompanied by high school teachers, to visit the space center at least four times each year for demonstrations, tours, lab work and other activities, Diggs said.

They would meet astronauts and technicians, view a shuttle launch from the VIP site and learn about NASA projects.

After the inaugural group begins this school year, 10 ninth-graders are to be selected in each of the next three years. The program is set to conclude in 1989 when the fourth class graduates, but could be continued if it's successful, Diggs said.

Students would have the option of continuing in the program during their first year of college.

NASA and the school system are looking for "reasonably high achievers who show a particular aptitude in math and science," he said.

"The goal is to instill an interest in them to being good engineers...and, of course, to come and work for NASA," he said. "We feel the market is here and we're going to continue to need engineers."

In addition to visits to the Center, students are expected to work on projects on their own time under supervision of NASA officials. Students won't be graded on their work, but their interest should enhance their learning, he said.

"We're hoping their accomplishment as a result of this will be the real payoff, rather than grades," Diggs said.

Unlike another NASA program where high school students nationwide compete to prepare actual space shuttle experiments, the NURTURE students would develop projects for their own education, he said.

However, a school spokesman said it is possible that some of the out-of-school work could be submitted to school teachers for credit.

The applicant screening committee won't be limited to interviewing women and minorities, but officials believe that enough students will apply so that some can be included.

Currently only "a limited number" of women and minorities enter into engineering fields, he said.

"Typically minorities and women have not received the training and support for entering into a number of careers," explained Dr. Jane Chaney, director of secondary programs and assessment for the school board.

This program is an attempt to address that problem, she said.

Chaney and Diggs agreed that the recruiting program would be considered a success if only 50 percent of the students involved choose an engineering career....(THE ORLANDO SENTINEL, 10-7-82, pp. C-1 & C-5)

<> Astronaut Joe Allen won't have much of a view when the space shuttle streaks into orbit November 11.

"I'll be looking squarely at 20 metal lockers," said Allen, 45, who will ride below deck during the launch. "I have this terrible vision: I imagine the screws coming loose on all those lockers."

Astronaut William Lenoir, who will occupy the below-deck seat during landing, has similar fears.

"I guess I'm in charge of religious activity," jokes Lenoir, 43, who has been offered a blindfold by his fellow astronauts.

Despite complaints about the seating arrangements, the shuttle's four crewmen said Wednesday they were "99 percent ready" to fly the Columbia's fifth mission. The shuttle should achieve several milestones during the five-day voyage:

- * The first satellites carried into orbit and launched from the shuttle.
- * The first shuttle spacewalk.
- * The first U.S. spaceflight with four astronauts.

It will also be the first shuttle flight with no ejection seats. The two ejection seats used on earlier flights have been disconnected.

"The crew made it clear that they would never entertain the notion of ejecting and leaving two fellow crewmen behind," said NASA spokesman Jim Ball.

After four non-profit test flights, NASA also is eager to prove that the shuttle can make money. Telesat Canada and Satellite Business Systems of Virginia will pay about \$8 million each to have their 8,000-pound satellites carried by the shuttle.

The satellites will spring from the shuttle cargo bay on the first and second days of the mission, after receiving a computer command from the shuttle.

"It ought to be quite a sight as we see it leave the cargo bay," said Vance Brand, 51, who will command the 82-orbit voyage.

Brand, a veteran of the 1975 Apollo-Soyuz flight, is the only crew member who has been in space before. Pilot Robert Overmyer, 46, and mission specialists Allen and Lenoir are rookies.

Columbia will have 45 minutes to steer clear before the satellites fire separate rocket motors and travel to higher, geostationary orbits. The shuttle will be about 16 miles away when that happens, its belly toward the blast to prevent damage.

The shuttle's robot arm will not be making the trip. Instead, the satellites will be ejected by a turn-table spinning at 50 revolutions per minute.

Allen and Lenoir will attempt a 3 1/2-hour spacewalk on their fourth day aloft. They will lift weights with a small winch, and practice making electrical repairs on a make-believe fuse box.

Some of the space tools are custom-built, others were purchased at Montgomery Ward and adapted by NASA. A 50-foot safety cord will keep the astronauts tethered to the shuttle hatch while they roam the cargo bay.

Both astronauts have practiced the space repairs several times in a huge swimming pool at Johnson Space Center, but working in a frictionless, weightless environment could be far more difficult.

Before exiting the shuttle, Allen and Lenoir will spend 3 1/2 hours inside an airlock, wearing their space-suits, to avoid decompression sickness. Lenoir said he plans to "get some sleep" during the wait.

The spacewalk should determine whether future astronauts will be able to rescue a stricken "Solar Max" satellite that broke down in July 1980.

Although the shuttle is designed to carry up to 10 astronauts in an emergency, prior shuttle missions have used two-man crews.

During launch and landing, one astronaut has to squeeze between the pilot and commander in a "kiddy seat." Another crewman must ride below. (THE ORLANDO SENTINEL, 10-7-82, p. A-4)

October 12: Split-second timing is nothing new to NASA. The space agency has dazzled television viewers with precision flights for more than two decades.

But if timing aboard the fifth flight of Columbia, now set for liftoff November 11, goes awry, two satellites worth more than \$20 million each could be ruined by the sun's heat.

NASA and its customers, Satellite Business Systems (SBS) of McLean, Va., and Telesat Canada Ltd. of Ottawa, are confident that preflight planning will allow their 7,200-pound communications satellites to be put into orbit without a hitch.

If they don't, commander Vance Brand and pilot Robert Overmyer will have just five minutes to flip the Shuttle over on its back to shield the sensitive satellites from the heat.

That's only one problem. If the satellites stay in the shade too long they could freeze.

If necessary, mission specialists Joseph Allen or William Lenoir might be called upon to take a space walk to get the launches under way. (TODAY, 10-12-82, p. 10A)

October 13: While space agency officials are confident they can launch the Shuttle Columbia on time next month, their fingers are crossed in meeting the scheduled January 20 launch of Challenger.

The sixth Shuttle mission, with an advanced tracking satellite as its cargo, could be pushed back as much as a week because of main engine problems.

A pressure leak in one of Challenger's three main engines has delayed delivery from the National Space Technology Labs in Mississippi to Kennedy Space Center where Challenger is being prepared for flight. The engines were scheduled to arrive in Brevard late last month.

The three Rockwell International engines must go through a battery of tests before becoming certified for installation in the Orbiter.

"During some of the calibration tests, we were not satisfied and we did it again," said James Kukowski, a NASA spokesman in Washington, D.C.

So far, two of the engines have been certified after a 500-second test firing and they should be delivered to KSC by November 22 or 23, said KSC spokesman Mark Hess. The third should arrive a few days later.

A flight readiness firing of Challenger engines on the launch pad should be feasible by Christmas.

"It (a Jan. 20 launch) is still conjecture. We're aiming for it but it's going to be tight," Kukowski said.

The space agency wants to maintain the present launching schedule in the interest of gaining the confidence of Shuttle customers. Commercial satellite companies and the Department of Defense both demand Shuttle launch times that won't slip.

Once Challenger's engines are at the KSC Shuttle hangar, Hess said there should be no manpower problems getting them installed and tested.

"The same people who do engine work on the Columbia will do it on the Challenger," he said.

"As soon as we get a delivery, we should be on a more firm schedule," he added. (TODAY, 10-13-82, p. 10A)

October 14: Indonesian President Suharto took a close look Wednesday at the Space Shuttle that will carry satellites designed to unite his vast island nation.

Suharto, 61, took a less than two-hour tour of launch facilities at the Kennedy Space Center. His trip included an elevator ride 190 feet above Launch Pad 39A where Columbia remains poised for its fifth flight scheduled for November 11.

Two Indonesian satellites called Palapa, will be launched from the Shuttle in April 1983 and January 1984 and will provide telephone and television service between the nation's many islands.

For Suharto, who came to power in 1965 after crushing a communist coup, the sophisticated satellites may be a tool to bring the often divided country together.

While Suharto declined to be interviewed, he said in prepared remarks that the launch of his country's satellites "will allow Indonesia to become cohesive geographically as well as politically, socially and economically. Palapa is very important in trying to unify our country."

With 145 million people, Indonesia is the world's fifth most populous nation and is the size of Alaska and California combined.

The space center is "a historic place of great importance to the whole world," Suharto said through an interpreter.

"We promise we'll give your (satellite) hardware tender loving care when it gets to Kennedy Space Center," said KSC Director Richard Smith.

Greeted by NASA Deputy Administrator Hans Mark and Smith, Suharto and his party of 90 also toured the Shuttle firing room and the hangar where the Shuttle Challenger is being prepared for its first flight in January.

American hosts and Indonesian guests exchanged gifts that included a bronze model of the Shuttle from NASA. Suharto presented Smith with the Indonesian coat of arms, a

sculptured shadow puppet of a legendary Indonesian man who flies without wings, and a framed color photograph of Suharto and his wife.

The Indonesian president arrived at the space center's runway at 1 p.m. from Washington, D.C., where he had met with President Reagan on Tuesday. From KSC, Suharto went on to Houston's Johnson Space Center for a tour of mission control. (TODAY, 10-14-82, p. 16A)

<> America's Shuttle program can remain in civilian hands as long as funding for it continues to come largely out of the civilian space agency, said Hans Mark, NASA's deputy administrator.

In an exclusive interview Wednesday, Mark disagreed with those in Washington who say the Department of Defense (should) pick up a greater share of Shuttle costs.

Under the new Shuttle pricing policy, the Defense Department will continue to get a discount compared to commercial Shuttle users, but all Shuttle users will pay more in 1985 than they do now.

Members of the House Science and Technology Committee, like Rep. Don Fuqua, D-Fla., have recommended the Pentagon pay higher fees and more program costs since as much as 40 percent of the Shuttle flights through the mid-1990s will be exclusively military.

"Until it's fully operational, I'd like to see NASA retain control. The more the Department of Defense spends on the Shuttle, the less we (NASA) are able to control it," Mark said.

Mark, a former secretary of the Air Force, is at Kennedy Space Center today to honor space center employees at an annual awards ceremony.

He predicts the Shuttle fleet will eventually include as many as six Orbiters, with the last being bought by the Air Force.

Another subject close to NASA's heart is a space station. While a multibillion-dollar space station is still in the planning stage, Mark said there are plenty of reasons to justify building it.

And he predicted it won't be solely up to the Pentagon to decide if the country needs a space station. The scientific applications, including zero gravity manufacturing plants, and national pride may be factors.

"Apollo was almost purely for the hell of it -- just to show we're better than the Russians," he said.

Although the Soviet Union has been experimenting with an unmanned Shuttle-type spacecraft, Mark said Russia still has no manned re-usable space vehicle.

"They're thinking about one. The same logic that drove us, drives them," he said, referring to both countries' aim to make space more accessible for commercial and military uses. (TODAY, 10-14-82, pp. 1A & 16A)

October 15: The highest award of Federally Employed Women's Space Coast Chapter was presented recently to Claude E. Leslie Jr., chief of the Repro-Graphics Branch, NASA, at KSC.

Lounette Price, chapter president, said the Distinguished Service Award for 1982 was presented in recognition of policies, actions and leadership that have increased opportunities for women. In addition to meeting established criteria for the award, she said, Leslie has shown extraordinary support to the chapter and has helped it to achieve the goals and aims of Federally Employed Women.

Leslie, who has been with NASA for nearly 22 years, said, "I'm flabbergasted that they've selected me, particularly with such an impressive field to choose from. It's an award I'll cherish for the rest of my life."

FEW's aims include ending sex discrimination in government service, increasing job opportunities for women and furthering the potential of all women. (SPACEPORT NEWS, 10-15-82, p. 4, Vol. 21, No. 21)

October 18: A private company has decided to proceed with its plans to build satellite servicing and processing facilities here that will augment the National Aeronautics and Space Administration facilities, which are growing increasingly inadequate.

Astrotech International will start construction of its laboratory/assembly operation January 1, and expects to be in business a year later, according to Robert J. Goss, president. The company has been studying the facility's potential since last summer, when it was named Space Services International. The name was changed to Astrotech to avoid confusing it with Space Services, Inc., which is developing the Conestoga rocket.

Wertheim & Co. of New York City is heading a team of institutions providing \$5-6 million in venture capital for plant construction and long-term debt.

Astrotech will market a capability to provide facilities and engineering services for payloads, upper propulsion stage processing and storage. Initial capability is estimated at 30 spacecraft a year. (AVIATION WEEK & SPACE TECHNOLOGY, 10-18-82, p. 15, Vol. 117, No. 16)

October 19: The two satellites that will fly aboard the Space Shuttle next month were loaded and secured inside the Columbia's 60-foot-long cargo bay Monday.

The communications satellites will pop from Columbia's cargo bay into space November 11 and 12 during the Shuttle's first operational flight.

Each satellite, weighing about 8,000 pounds, was rolled into the cargo bay on a railing that led from a special room at the top of the launch pad to Columbia.

Once in their respective cradles in the cargo bay, the satellites were latched into place.

Shuttle engineers will spend today and Wednesday testing electrical connections between the satellites and spacecraft, said Mark Hess, NASA spokesman.

The first satellite, owned by Satellite Business Systems, will be launched into space about eight hours after the Shuttle lifts off from launch pad 39A.

A Canadian satellite -- called the Anik and owned by Telesat of Canada -- will spring from the cargo bay about 24 hours later.

A spacecraft motor in each satellite will be used to put them into orbit 22,300 miles over the equator. (TODAY, 10-19-82, p. 12A)

October 22: The Federal Systems Division of International Business Machines Corporation, Cape Canaveral, has been awarded a \$434,000 contract by NASA's John F. Kennedy Space Center.

The contract calls for IBM to conduct a study for further development of a computer software program which aids in automated planning and scheduling for Space Shuttle payloads. The study is to be completed by September 30, 1983. (KSC RELEASE NO. 245-82, 10-22-82)

<> The Air Force Space Division has made a decision to join NASA in a procurement effort which will eventually lead to selection of a single contractor for the processing of the Space Shuttle at both the NASA Kennedy Space Center and Vandenberg Air Force Base launch facilities.

NASA expects to issue a request for proposals for this joint effort in January, 1983.

Both NASA and the Air Force will consolidate contracts for flight hardware processing at both the Florida and California launch sites. At present, processing of Space Shuttle hardware is carried out at the launch site by several contractors who supply the flight hardware.

Originally, the Air Force had not defined a time to phase in the Shuttle Processing Contract at Vandenberg Air Force Base. It is now planned that the shuttle processing contractor will be phased into Vandenberg processing as early as practicable and will be assigned launch

responsibility in accordance with transition criteria. In accomplishing the phase-in, the shuttle processing contractor will work with the incumbent launch site contractor at the Air Force Base.

The new contract will result in significant cost savings during the operational era of shuttle. It will minimize interfaces at launch and landing sites and focus clear responsibility on a single contractor. This focus of responsibility should improve flight safety and mission effectiveness. (KSC RELEASE NO. 248-82, 10-22-82)

- <> A rocket that can skip through the upper atmosphere like a flat stone on a pond may become another piece of reusable Space Shuttle hardware by the end of the decade.

The Orbit Transfer Vehicle would return to the Shuttle's lower orbit, and, using the atmosphere as a brake, would slow down from 23,000 mph to the Shuttle's speed of 17,000 mph.

Astronauts inside the Shuttle would maneuver the robot arm and pluck the Orbit Transfer Vehicle from space and place it into the 60-foot-long cargo bay for a return trip to Earth.

"It's a relatively expensive piece of hardware that should be built for retrieval and reuse. Instead of losing it, the only cost we'd have is to refurbish it," said Gene Austin, NASA engineer in charge of studying the concept.

By launching satellites with the reusable rocket, NASA could save the \$2 million to \$3 million it would otherwise spend to outfit each Shuttle with a new rocket.

The space agency selected two firms, Boeing Aerospace Co. of Seattle and General Electric Re-entry Systems of Philadelphia to identify the technology necessary in building such spacecraft.

Each of the contracts is valued at \$200,000. The studies began September 30, Austin said.

In one design, a balloon made of a ceramic fiber would inflate once the rocket has descended from high orbit to about 50 miles up. The balloon would act as a brake against the thin upper atmosphere before the rocket swings out into an orbit around the Earth at the Shuttle's altitude of 180 miles.

"It won't be captured by the atmosphere. The friction of the air against the vehicle provides enough drag to slow it down," said Austin, who added that such a maneuver would save fuel. That extra fuel could be used to increase the rocket's satellite-hauling capability.

The ceramic balloon would be made of a highly heat-resistant substance, like the Shuttle's exterior coat of tiles. Austin said it would have to withstand temperatures of up to 2,000 degrees.

Said Austin, "Flying in that part of the atmosphere is tricky. We don't have much history flying through there." (TODAY, 10-22-82, pp. 1A & 18A)

October 24: Despite a three-year downswing in Florida's tourist industry, local promoters are kicking hard at a sagging economy and a decline in international tourism to lure new tourism dollars and visibility to the Space Coast.

With the relaunching of America's space program, major cruise ship lines and a glimpse of the future just across SR 528, officials are hoping to bring 20 million visitors to Central Florida and the Space Coast this year.

With the dawn of the Space Shuttle era, Kennedy Space Center has become the third largest tourist draw in the state.

This year, KSC's Visitors Center is operating about 5 percent off last year's 2 million attendance figure, which was the Space Center's best year ever, said George Meguiar, KSC public relations manager.

Though KSC faces stiff competition from the economy and the 1982 Knoxville's World's Fair, the Space Center still enjoys a steady stream of international visitors. "If we're not

the number one preference in European markets, we're number two," he said. And that interest persists despite a recent decline in international tourists' buying power in America.

The center has completed about 35 percent of its expansion project, which will bring additional theaters and exhibit areas. And exhibits at the Visitors Center will be described in four languages beginning January 1. (TODAY, 10-24-82)

October 28: A towering Delta rocket cut a glowing swath through the night sky Wednesday propelling a state-of-the-art communication satellite into space.

The satellite, RCA SATCOM-5, will provide Alaska residents with improved long-distance telephone and television service.

The launch, from Cape Canaveral Air Force Station at 9:27 p.m. , could be seen throughout most of the county. Careful observers could notice the burnout of the rocket's six powerful boosters that sent the spacecraft to a height of 8 miles in just under a minute.

Within three minutes after liftoff, the 116-foot-high rocket was at the edge of the Earth's atmosphere and still flying with propulsion from a second stage motor.

By early next week, SATCOM 5 will be operational and orbiting the Earth over the South Pacific at an altitude of 22,300 miles.

SATCOM 5 will provide several Alaskan television services including the Rural Area Network and an emergency medical network to isolated areas.

The satellite, the first to be bought by a state for its own use, will be owned by Alascom Inc., but RCA will maintain the spacecraft for its eight-year life.

The 2,385-pound SATCOM 5 also is the first satellite to use solid state transmitters, making them more reliable and durable.

Each of the 24 transmitters/receivers can relay two color television signals -- double the capacity of prior RCA SATCOMs. And a single transmitter/receiver can carry about 1,400 two-way telephone calls... (TODAY, 10-28-82, p. 20A)

October 29: The space agency has decided to abandon plans to rely on computers to guide the space shuttle Columbia to a "hands-off" landing at the end of its fifth mission beginning November 11, the agency reported Thursday /October 28/ in Washington.

Spokesmen said two landing simulators' lack of agreement on computer solutions for automated landing maneuvers was the key reason the automatic-landing test was called off. But the method may be used on a later flight. (THE ORLANDO SENTINEL, 10-29-82)

<> KSC's cargo officials agree that the first commercial flight of the Space Shuttle will mean the coming of age for the Space Transportation System.

Calling the fifth mission the "STS-1 of the cargo world," both John Neilon (CP) and Tom Walton (CO) recently contrasted launching cargo from the shuttle and launching it from an expendable booster.

Neilon said, "The main difference with Space Shuttle cargo is that the cargo must share space with other payloads. From processing and facilities scheduling to checkout people to actual room in the orbiter and crew interaction, the cargo customer must learn togetherness."

"The safety considerations also change considerably, both from the standpoint of protecting the launch vehicle and other payloads and in protecting a human crew as well. Those are things we've never had to worry about with expendables," Neilon said.

Walton agreed. "The orbiters are not only about four times as complex as an expendable rocket system, but have the capacity to carry vastly different kinds of payloads on the same flight. Our checkout procedures must be much more complex both on and off line to ensure everything is compatible," he said.

Both men agreed that there have been no significant problems during the checkout of the STS-5 cargo. The tests have proceeded with only the expected "growing pains" associated with a new system being used for the first time. The two attribute this smoothness to the professional approach taken by the various test teams.

Responding to recent news reports about a company which proposes to provide payload checkout facilities on a commercial basis, both Walton and Neilon welcomed the concept. "There could be a tremendous facilities crunch if the numbers of payloads increase as much as we expect," said Walton. "Cargo processing by a private concern would eliminate much of the congestion." Neilon added that the concept "would hold down our launch processing costs by not forcing us to update our checkout facilities over time."

On the commercialization of space itself, both men once again agree. Walton said, "I am eager to see the commercial aspect of space flight. We already have made great inroads in this area, and I see the practical, commercial usage of space taking a predominant role in the future."

This particular commercial payload has a special significance for Neilon. "I was the launch director for the first launch of a domestic, commercial communications satellite. Ironically, that was TELESAT 1, launched almost exactly ten years ago on November 9, 1972. It's a great thrill to be closely involved in this launch of a TELESAT 'bird' on the first commercial Space Shuttle flight," he said. (SPACEPORT NEWS, 10-29-82, pp. 1 & 6, Vol. 21, No. 22)

<> Some of the 270 were new to the annual presentation of awards for exceptional and faithful service. Others had stood to be recognized before, with other honors.

Some were recent additions to KSC -- while others were being thanked for 25, 35, even 45 years of service to their government.

The presentations cited exceptional service and achievement in such fields as engineering, science, administration, personnel, work methods, manufacturing techniques and other

space-related endeavors.../For a complete list of persons receiving awards see the issue of SPACEPORT NEWS cited below; a copy of the issue is on file in the Archives, room 1533, Headquarters Building, KSC, FL/ (SPACEPORT NEWS, 10-29-82, p. 5, Vol. 21, No. 22)

NOVEMBER 1982

November 1: An unscheduled hold of 5 minutes or more late in the countdown for the fifth space shuttle launch could cause a postponement of at least a day.

Subsequent shuttle missions also face this new countdown restriction, which results from the elimination of the anti-geyser line in the external tank to reduce weight. This move saves 600 pounds that can be added to cargo capacity, but it cuts the time in half during which a contingency hold can be called and not cause a postponement in the period from T-8 minutes 55 seconds to launch. There are no planned holds during this period of the count.

The anti-geyser line was incorporated in the first four mission external tanks to provide a circulation path to reduce the accumulation of gaseous oxygen in the feedline. It also was designed to prevent accumulation of liquid oxygen in the ullage area, which would rapidly reduce ullage temperature, reduce ullage pressure and could cause the liquid oxygen tank to collapse. (AVIATION WEEK & SPACE TECHNOLOGY, 11-1-82, p. 19, Vol. 117 No. 18)

<> Wackenhut Services, Inc., of Coral Gables, Florida, has been awarded a \$1,377,116 extension of its contract with NASA to provide protective services at the Kennedy Space Center.

Under the terms of the contract, Wackenhut is to furnish security, law enforcement and fire protection and rescue personnel at KSC. Wackenhut is also to provide plant protection and fire prevention programs for employees at the Center. The extension covers the period from November 1 to November 30, 1982.

Wackenhut has provided protective services at the Kennedy Space Center since 1978. The new award brings the total contract value to \$50,370,921. (KSC RELEASE NO: 30?-82, 11-1-82)

<> NASA's John F. Kennedy Space Center has awarded a \$1,060,000 contract extension to Reynolds, Smith and Hills, a Jacksonville architectural firm, for support of the Space Shuttle program.

Reynolds, Smith and Hills will provide design services for conversion of a mobile launcher used in the Apollo program to a mobile launcher platform that can be used for the Space Shuttle. The fixed-price contract stipulates that the design will be completed by August 31, 1983. (KSC RELEASE NO. 304-82, 11-1-82)

November 3: McGregor and Werner, Inc., of Washington, D.C., has been awarded a \$515,530 contract extension by NASA's John F. Kennedy Space Center to provide printing, publication and reproduction services for the Space Center. This extension brings the cumulative value of McGregor and Werner's contract with NASA to \$21,638,882.

The cost-plus-fixed-fee contract, which covers the period from November 1 through November 30, 1982, stipulates that McGregor and Werner will functionally manage printing, publication, reproduction, graphics, and microfilming and audiovisual operations for KSC. (KSC RELEASE NO. 310-82, 11-3-82)

<> NASA's John F. Kennedy Space Center has awarded a \$1,252,000 contract to David Boland, Inc., Titusville, Florida, for modifications to the Orbiter Processing Facility (OPF) where Space Shuttle orbiters are prepared for launch.

Work under the fixed price contract is to be done within 275 calendar days. The award was one that was set-aside for a small business firm. (KSC RELEASE NO. 306-82, 11-3-82)

November 4: NASA's John F. Kennedy Space Center has awarded a \$1,269,770 contract to the Holloway Corporation, a Titusville, Florida, construction firm, for support of the Space Shuttle.

The contract calls for the Holloway Corporation to construct environmental control system facilities which will be used for shuttle orbiters while they are being processed and readied for flight in the Orbiter Processing Facility at KSC. The Holloway Corporation will construct two equipment rooms which will house the system that will supply an air-conditioned atmosphere to ensure the environmental stability of the orbiter. Presently, a mobile environmental control system is used for the orbiter as it is transported from one place to another for processing. The contract provides for the work to be completed by September 30, 1983. (KSC RELEASE NO. 311-82, 11-4-82)

November 6: A \$30 million lawsuit charging NASA with negligence was filed Friday by a man who said he and four co-workers were sent into a space shuttle compartment filled with nitrogen gas.

Two men died and 27-year-old Nicholas Mullon claims the March 19, 1981, accident at the Kennedy Space Center left him with severe brain damage, sudden personality changes and other psychological disorders.

The lawsuit, filed Friday /Nov. 5/ in U.S. District Court in Orlando, claims that before the accident Mullon worked 50 to 60 hours a week on the space shuttle as a technician for Rockwell International. At night he went to school working toward an engineering degree. On weekends he served with the Army National Guard.

But that was before Mullon and four other Rockwell International technicians, after an all-clear signal, entered a compartment filled with nitrogen gas located just behind the shuttle's three main engines. Two men died and Mullon and two others were seriously injured.

Mullon and his wife, Denise, charged the United States, Pan American World Airways and Wackenhut Services Inc. with negligence. (THE ORLANDO SENTINEL, 11-6-82, p. B-1)

November 7: Ho-hum. Another Shuttle launch.

Although Brevard County students used to be shipped out by the busloads to watch past Shuttle launches, only one bus has been scheduled for a field trip to watch this Thursday's launch, said Nelson Rutledge, director of school transportation.

Some school officials say the lack of scheduled field trips to watch the event may indicate that Brevard students are getting used to the event.

"We're so far along...it seems like old hat now," Rutledge said. "I remember the first couple of launches -- there were a lot of requests. I'm a little surprised there weren't more requests this time. I don't know why there wasn't more interest."

The fact that Thursday already is a holiday for Brevard students because of Veterans Day and that the Shuttle launch is scheduled at 7:19 a.m. may have contributed to the lack of organized trips. (TODAY, 11-7-82)

November 8: The countdown toward Thursday morning's launch of Space Shuttle Columbia began without a hitch at 3 a.m. Sunday, as dozens of engineers and technicians responded to the "call to station" at Kennedy Space Center.

The Orbiter's electrical system was switched on, the 60-foot-long payload doors were closed and the pad cleared so the hazardous job of pressurizing the Columbia's on-board fuel tanks for flight could begin, said KSC spokesman Rocky Raab.

The pad was to be re-opened at 7 a.m. today so workers could begin preparations for filling the Shuttle's fuel cell reactant tanks with liquid oxygen and hydrogen, which will be converted to drinking water and electricity during the five-day flight.

The filling is scheduled to start about 7 tonight, followed by a built-in hold of eight hours beginning at 1 a.m. Tuesday. There are 20 hours and 19 minutes of holds set into the countdown.

Although the launch, scheduled for 7:19 a.m. Thursday will be Columbia's fifth, it will still be a first in many other ways.

It will be the first commercial flight as two companies -- Satellite Business Systems of McLean, Virginia, and Telesat of Canada in Ottawa, Ontario -- have paid NASA between \$8 million and \$9 million each to put their satellites in space.

It will feature the first spacewalk by Americans in almost a decade. And it will be the first Shuttle mission to carry four astronauts.

The four crew members are Vance Brand, Joe Allen, Robert Overmyer and William Lenoir.

Columbia is scheduled to land at Edwards Air Force Base, California, at 9:27 a.m. EST November 16. (TODAY, 11-8-82, p. 1A)

<> The obvious ideas are usually the most overlooked, and for that reason, you can probably appreciate what Merritt Island's Alfred McGee -- with help from his wife and two daughters -- has pulled off.

As 1982 heads into the home-stretch and the nation scrambles its brains for year-end gift ideas, one item likely to draw some attention is the 1983 edition of the "Space Shuttle Collection" calendar.

Complete with full-color NASA glossies of the Orbiter and its environment, calendar orders already have hit the 23,000 mark. Add that to the 52,000 copies of the 1982 edition, and you've got some calendars being moved. And the Christmas season won't hit its stride for another month.

"Sometimes," understated McGee, "it's the simple things in life that shoot off like a rocket. It was just a flat-out brainstorm."

During 12 years since 1967, McGee was an environmental control/life support system specialist at Kennedy Space Center. Anticipating the computer age, he shifted his sights to software and joined NASA's Digital Electronics Engineering Division. Yet, work that might blow the mental fuses of most people wasn't enough to sustain McGee. Something was missing.

"You look around and you see some of the great things that people have done to leave their mark, and you start to ask yourself 'What have you done?'" he mused. "You go, 'Well, gee, I don't know, but I'd like to do something significant.' It was nagging at me."

And suddenly, in early 1981, it became obvious: the Space Shuttle calendar. Fresh and unprecedented. Use NASA photos, which were public domain. Arrange said photos in linear fashion to create a sequential, storyboard effect. Accompany them with explanatory notation. Commemorate the significant dates in aerospace history, send them to a printing company and sell them for \$4.50 apiece.

"I wanted something that would tell people the story of the Space Shuttle, but I didn't want something like a book where you'd read it once and never look at it again," McGee said. "I wanted something you'd be aware of all the time...." (TODAY, 11-8-82, p. 1B)

November 10: Like the Space Shuttle program itself, the list of VIPs who'll see the 7:19 a.m. launch of Columbia Thursday /Nov. 11/ is downright business-like.

No longer is the NASA and NASA-contractor guest list for Shuttle launches headed by celebrities such as Robert Redford and Carol Burnett, but rather by the presidents, chairmen of the board and chief executive officers of Fortune 500 corporations; present and potential customers for the Space Shuttle; Shuttle contractors, a handful of former astronauts, an ambassador and lots of congressmen.

The best known names, perhaps, on the NASA list of "distinguished guests" released Tuesday are author James Michener, whose latest novel, "Space," is already on the best seller list; Bum Phillips, coach of the New Orleans Saints; and former astronauts David R. Scott, Richard Gordon, Thomas P. Stafford, Gerald Carr, Eugene Cernan, Donn Eisele and Donald K. (Deke) Slayton.

In Wall Street Journal circles, perhaps the most impressive names would be Frank Cary, chairman of the board of IBM Corp.; Frank McPherson, president of McGraw Hill Publishing Co., and Frederick W. Smith, chairman of the board of Federal Express Corp.

Heading the congressional delegation will be U.S. Rep. Don Fuqua, chairman of the House Committee on Science and Technology, who'll bring a group of about 35 or 40 congressmen and guests; U.S. Reps. Marilyn Bouquard, D-Tenn; Beverly Byron, D-Maryland; Glenn English, D-Oklahoma; L.H. Fountain, D-N.C.; William Green, R-N.Y.; Bill Nelson, D-Melbourne, /Florida/; Harold Hollenbeck, R-N.J.; Tom Harkin, D-Iowa; Frank Wolfe, R-Virginia; and John T. Myers, R-Indiana.

Former Secretary of Labor William J. Usery, Jr. is expected to attend, as is the Canadian Ambassador to the United States, Allen E. Gotlieb. Actor James Garner has been invited, but has not confirmed whether he will attend.

"The guest list this time is geared to industry, and potential and present customers for the Space Shuttle," said Arnold Richman, chief of Visitors Services, NASA Public Affairs. "For the upcoming Shuttle launches, it will depend on the payload. Like SpaceLab, for instance, that will be geared toward the Europeans who are involved."

Of the Fortune 500 corporations and companies on that distinguished list, about 180 will be represented at Thursday's launch, according to Richman. The list was put together by the American Society of Engineers, but the invitations were issued by NASA. (TODAY, 11-10-82, p. 1D)

November 11: Breakaway bolts have been replaced in the Space Shuttle's rocket booster apparatus and NASA is confident the valuable booster casings won't sink again as they did after last June's launch.

Pieces of a \$25 million pair of boosters are still rusting on the Atlantic Ocean floor where they sank minutes after the Shuttle's fourth launch.

"This time we've gone to two solid bolts and there shouldn't be any problem," said NASA spokesman Carl Jones.

Six parachutes are deployed to slow the boosters' descent to splashdown. In June, the chutes detached early, allowing the heavy steel casings to plummet back to the Atlantic.

Jones said the malfunction occurred when breakaway bolts that hold the chutes to the casings released too soon. The boosters "hit the water too fast and exploded," he said.

During the summer, the bolts were replaced with two solid bolts. (TODAY, 11-11-82)

<> If Columbia launches on time today, its crew could have two "reasonably close" encounters with the Soviets' manned Salyut 7 spacecraft during the first four hours of flight.

The nearest approach would be 48 miles, perhaps close enough for the crews to sight one another if they are looking in the right direction and lighting conditions are right.

"We gave our astronauts no special instructions to wave out the window, but we expect the Russians will have some sensors on us to learn what they can about our machine," said Lt. Gen. James A. Abrahamson, NASA's associate administrator for space flight.

"We're happy to show it to them," he added.

With Columbia headed on a southeast course and Salyut moving north-northeast, the ships will close to within about 850 miles 10 minutes after the planned liftoff.

That will be over the middle of the Atlantic Ocean.

They'll drift apart, only to pass within 48 miles of each other at 11:16 a.m. high above the Indian Ocean. (TODAY, 11-11-82)

<> At first glance, the fact that President Reagan hasn't yet witnessed a launch of America's most spectacular spacecraft seems like an unmistakable rebuff to NASA.

During the preparations for five launches, including today's liftoff, Reagan still hasn't had space on his agenda for Kennedy Space Center.

But putting it into historical perspective tempers that apparent snub of NASA. Of all the presidents commanding the nation's space program, only Richard Nixon watched a manned vehicle blast off during his incumbency.

Even President John F. Kennedy -- who viewed NASA as the salvation of the nation and strived to ensure its future up to his dying day -- never viewed a liftoff.

White House aides said Reagan hasn't been able to squeeze in the ceremonial task of witnessing a launch, but he hasn't ruled out the possibility for the future. (TODAY, 11-11-82)

<> As Shuttle Columbia touches down Tuesday on the California lake bed at Edwards Air Force Base, her sister ship Challenger will leave its cocoon at Kennedy Space Center's Orbiter Processing Facility for final pre-launch preparations.

Challenger, actually built before Columbia, will wheel to KSC's Vehicle Assembly Building to mate with its fuel tank, solid rocket boosters and mobile launch platform for its inaugural January 24 dash into space.

Challenger, which ferried to KSC atop a 747 jumbo jet in early July, was originally constructed as a "structural test article," said NASA public affairs official Brian Welch in Houston.

"The original idea was to build an Orbiter and shake it till it fell apart to see what it would take structurally," Welch said.

However, plans changed and Challenger was readied for operational flight.

Basically, the 75-ton Challenger is stronger, almost 25 tons lighter, and more stable than her forerunner.

"Columbia can take up to six vertical Gs, meaning how hard you can pop it on the runway when you land," Welch explained. "Challenger can take eight (vertical Gs)."

In the cockpit, Challenger will not use the ejection seats currently installed in Columbia but deactivated for the fifth flight.

Challenger's flight instruments also differ from Columbia's -- another transition from test development to practical operation.

Columbia's myriad sensors and measurement instruments have been replaced by mission support gear in Challenger like the Ku-band antenna system used to track satellites. (TODAY, 11-11-82)

<> The space shuttle Columbia and its crew of four were pronounced in "great shape" Wednesday for today's commercial debut of the space agency's billion-dollar flying machine.

This time, the fiery liftoff from the Kennedy Space Center will be only a prelude to the delivery of the spacecraft's first commercial cargo -- a \$23 million communications satellite that will be released as the shuttle passes over the Pacific Ocean at 3:18 p.m. today /Nov. 11/.

"The men are in great shape and the machine is in great shape," said Lt. Gen. James Abrahamson, the associate administrator of the National Aeronautics and Space Administration.

The only cloud over the whole schedule, in fact, appeared to be the vagaries of earthly weather.

"We expect great weather tomorrow," Abrahamson explained, beaming, under clear, sunny skies at mid-day Wednesday.

An hour later Abrahamson and scores of others were scurrying for cover as a cloudburst soaked the spaceport.

Rain was falling in California, too, where a fierce winter storm had already soaked the dry lake bed where the shuttle had been scheduled to land Tuesday after five days in space.

Officials said a landing on an all-weather, concrete runway at Edwards Air Force Base was still planned, but any new storm moving in from the Pacific Ocean could force NASA to keep the shuttle in space for a day or so more, waiting for better weather.

"We seem to have the only desert in the world that floods when we want to use it," Abrahamson noted ruefully. (THE MIAMI HERALD, 11-11-82, p. 1A)

November 12: The space shuttle Columbia and its four-man crew made America's first business trip into space Thursday /Nov. 11/ with a billowing, 50-mile plume of rocket exhaust behind them and a new era in the commercial use of space ahead.

Seven hours and 59 minutes after a "picture perfect" launch from Florida's Kennedy Space Center, the shuttle made its formal debut as the world's first space freighter and the astronauts made their first delivery -- a one-ton communications satellite shoved gently into space as Columbia sped toward the west coast of South America.

"We deliver," the crew reported to Houston's mission control center shortly after ejecting the satellite.

"We still have that beautiful satellite in sight; everything looks good," reported astronaut Joe Allen. (THE MIAMI HERALD, 11-12-82, p. 1A)

<> Only about 150,000 sleepy bird watchers lined the causeways and riverfronts for the space shuttle's fifth launch, the smallest crowd yet and considerably less than had been expected.

Missing, too, were the massive traffic tie-ups that have plagued previous launches. Although bottlenecks slowed progress on Merritt Island and the beaches, traffic was near normal in most areas within two hours after launch, police reported.

The Veterans Day parade on Merritt Island, which had been considered the biggest potential traffic problem, went off smoothly and on time at 11 a.m.

The small turnout was a surprise to business people who had been besieged by early motel reservation requests and were getting steady inquiries from southbound winter visitors.

The best guess earlier this week was 500,000, about the same number which showed up for the last launch. One enthusiastic chamber of commerce leader predicted a crowd of 750,000, but the Brevard County Sheriff's Department said Thursday only about 150,000 showed up.

Space center officials have predicted that interest in shuttle launches would lag as the space shots became more frequent. (THE ORLANDO SENTINEL, 11-12-82)

<> NASA Administrator James Beggs called Thursday's launch of the Space Shuttle Columbia "our best yet."

"We don't do them any better. The good Lord gave us a perfect day and we thought we'd better have a perfect launch," said Beggs, who watched the launch from the firing room at Kennedy Space Center.

"We were really pleased with how this one moved on," Beggs said. "When you move from an experimental stage to a commercial stage in anything, you worry. We have worried, but it has gone beautifully."

Besides being pleased with the successful beginning of the fifth Shuttle mission, "I was very pleased to see that we had the same number of accredited press this time. We had 1,500 last time and the same this time. Even though it's the fifth launch, they couldn't stay away." (TODAY, 11-12-82)

November 14: Part of the fun and excitement of helping cover a launch, such as the STS-5 launch Thursday /Nov. 11/, is meeting and talking to former astronauts who come back to experience part of the thrill of yesteryear missions.

Here are some astronaut footnotes to our coverage of the Columbia's beautiful launch Thursday morning.

Deke Slayton, the last of the original seven Mercury astronauts to retire, came to the launch as a civilian for the first time in the history of our space program. According to the handsome, graying former astronaut, he thoroughly enjoyed being there. In fact, it was his first visit ever to the VIP viewing site.

But, life is very different for Slayton than it was a year ago. Now, he's working for Space Services, a Texas company that hopes eventually to give the Space Shuttle some competition by taking civilian payloads into space. The company has so far produced two launches, one that blew up about a year ago, and one successful sub-orbital flight in September.

"About two years from now, we'll launch an orbital missile. We wanted to demonstrate (through the sub-orbital launch) to the government and to business and industry that it was possible and we did," said Slayton. "There's a lot of interest out there in what we're doing. It's sort of like the chicken and the egg thing. For them, it's if you've got the spacecraft, we've got the payload and for us, it's if we can get the payload, we'll supply the spacecraft.

"I'm enjoying being out of the military," he said. "There's no bureaucracy and no paper work. I can make a decision in 10 minutes and go do it. It's a refreshing atmosphere to be working in. The man I work for, David Hannah, is a real neat guy. He could have retired a long time ago, but wanted to see if this idea of his was feasible. No one wants to take a risk anymore. They've (most business and industry) become dependent on the U.S. Government. If they can't get a cost-plus contract, they don't want to do it."

Slayton went from one exciting event to another. On Saturday, he was the keynote speaker at the 50th anniversary celebration of the British Interplanetary Society in London. "When you count backwards 50 years and realize there was no space program then, you have to realize they were people with vision," said Slayton.

Slayton's last mission was in 1975 when he flew along with STS-5 Astronaut Vance Brand and Tom Stafford in the Apollo-Soyuz Test Project that linked in space American astronauts with Soviet cosmonauts. He was 51 at the time. Vance Brand is the same age now as he flies in Columbia's five-day voyage into space.

...Former Gemini 6, Apollo 8 and ASTP astronaut Tom Stafford was in town, too. A Lt. Gen. who served as Air Force Deputy Chief of Staff for Research and Development before his retirement, Stafford now is a partner in a consulting firm in Alexandria, Virginia. Stafford, Burke and Hecker, Inc., provides consulting services to billion dollar clients interested in the space business.

When Tom Stafford flew on ASTP, his representative in the Moscow Control Center was STS-5 Astronaut Bob Overmyer. "This is a special one (launch) for me, because of Bob," said Stafford at a pre-launch party hosted by Apollo 9 and 15 Astronaut David Scott at the Polaris International Club in Cocoa Beach.

"ASTP was my fourth and final mission," said Stafford. "But I can't complain. I flew four times on key missions and I was commander three of those four times. I am a three-star general. But, anything is anti-climactic after space."

...Friendly Ron Evans, one of everyone's favorite astronauts, said "I'd still be in the program if it weren't for the hiatus -- it was going to be five years before there would be another mission and that was just too long to wait. Plus, I was anxious to see how I would do in the business field. There's a certain age, like the early 40s, where you don't want to wait too much longer to get started in business. But if it hadn't been for that five-year hiatus, I'd still be in the program, believe me.

"I was lucky enough to be in the program when people could really relate to what we're doing. They could relate to going to the moon. I think it's tougher for people to relate to going around the earth. Now, if we get to the point where we have a space station out there, they'll be able to relate to that."

Does Evans feel the public is still interested in the space program. "It never ceases to amaze me," he said. "Whenever I make a public appearance around the country -- I do a lot

of speaking engagements for organizations totally uninvolved with the space program -- the place is always full. People want to meet me, find out what I'm doing these days. I'm not recognized on the street, of course, but if they know who I am, they're truly interested." (TODAY, 11-14-82, p. 1E)

November 15: Parachute recovery systems on both solid propellant boosters functioned as planned in space shuttle Mission 5, and the boosters came down about 140 miles off the Florida coast only 8 miles from the United Technologies Corp. recovery vessels Liberty and Freedom.

Mission 4 boosters sank in 600 fathoms off the Florida coast when parachute separation systems failed. The boosters were dragged to the bottom.

Mission 5 parachutes were released on ocean impact, and all six main parachutes were spotted shortly after. The boosters themselves rode high in a spar position with about 20 feet of each above water. The boosters and parachutes were scheduled to be returned to Port Canaveral by the afternoon of November 12. (AVIATION WEEK & SPACE TECHNOLOGY, 11-15-82, p. 21, Vol. 117, No. 20)

<> Failure of command electronics on the Satellite Business Systems payload assist module threatened the schedule for launch of the fifth space shuttle mission and resulted in potentially harmful commands being sent to the satellite.

As a result of the malfunction, both the SBS and Telesat Canada payload assist modules had to be rewired in the payload bay to provide an extra measure of protection against recurrence of the problem in orbit. The rewiring was done with the orbiter positioned vertically on Pad 39A. (AVIATION WEEK & SPACE TECHNOLOGY, 11-15-82, p. 19, Vol. 117, No. 20)

<> Launch countdown procedures for the fifth space shuttle mission were a replica of those used in the previous count in preparing systems for launch.

There were problems, but Robert B. Sieck, chief shuttle project engineer, said they were minor and well within the hold-time capabilities of being corrected.

"We want to see the procedures get more repetitious and mature -- but not routine," he said.

Alfred D. O'Hara, director of shuttle processing, called the Mission 5 countdown near perfect. (AVIATION WEEK & SPACE TECHNOLOGY, 11-15-82, p. 20, Vol. 117, No. 20)

<> Shuttle program goal of an operational space transport carrying paying cargo and multiple passengers became reality November 11 as the orbiter Columbia flew its fifth launch ascent using procedures now being standardized for the vehicle.

The shuttle's liftoff weight for its first operational mission was about 14 tons heavier than on its initial flight, reflecting provisions for a four-man crew and the Satellite Business Systems and Telesat Canada spacecraft cargo. Ascent procedures used by astronauts Vance D. Brand, Marine Colonel Robert F. Overmyer, Joseph P. Allen and William B. Lenoir will be the standard for most future flights, thus simplifying crew training and smoothing reusable space transport operations.

The launch represented the first time in U.S. or Soviet manned flight history that four crewmen were launched at the same time. Lenoir flew in a cockpit jumpseat position while Allen rode in a seat in the orbiter middeck.

The ascent trajectory was slightly depressed because of 70-kt. headwinds. The night before liftoff, shuttle management was somewhat concerned that the winds at 40,000 feet would have an unacceptable cross component on the vertical stabilizer. Analysis showed no flight safety problems, however.

Columbia's fifth ascent also differed from its previous launches in several areas because of both revised solid rocket booster and abort capabilities and the spacecraft's heavy liftoff weight. The Mission 5 liftoff weight target of 4,494,556 pounds is over 5,000 pounds heavier than Mission 4 and about 28,000 pounds heavier than on shuttle's first flight.

Main engine throttle-down profile used to slow vehicle acceleration during the period of maximum dynamic loads as Columbia approached Mach 1 differed markedly during this launch compared with earlier flights.

About 33 seconds into the climbout, the three Rocketdyne engines were automatically throttled down to 85% thrust compared with the earlier 68% throttle-down level originally planned for Mission 5. The 68% would have been more like that used on all the previous flights.

The need to maintain higher main engine thrust levels resulted from a determination that the United Space Boosters /Thiokol solid rocket motors have slightly less performance than calculated earlier. With less performance from the solids, the vehicle had to use somewhat higher thrust levels from the main engines to hit the desired velocity, altitude and dynamic pressure targets at Max-Q, the point of maximum aerodynamic loads.

The heavier vehicle weight also was a factor in maintaining higher main engine thrust levels during the throttle-down period. (AVIATION WEEK & SPACE TECHNOLOGY, 11-15-82, p. 18, Vol. 117, No. 20)

November 16: In a remote southwest corner of the Kennedy Space Center, physically isolated from the mainstream of KSC activity and unseen by most employees, the round eyes of four large dish antennas constantly scan the heavens. Originally code- designated "MILA," for Merritt Island Launch Annex, the call sign of this tracking station has endured since 1965, when it was built to support the Apollo-Saturn program.

MILA currently stays busy supporting numerous scientific spacecraft, including the Solar Maximum Mission, ISEE-1, Nimb's VII, Landsat IV, and both Dynamic Explorer spacecraft. Its past credits include support of both Viking missions to Mars and the two Voyager missions to Jupiter and Saturn.

MILA is called the "launch station" when it receives data during the early phases of the Space Shuttle or Atlas-Centaur and Delta flights. Part of NASA's worldwide Space-flight Tracking and Data Network (STDN) system, it is

managed by the Goddard Space Flight Center and operated by Bendix Field Engineering Corporation. A total of 127 personnel staff the station 24 hours-a-day, seven-days-a-week.

The computers and other equipment at MILA provide uplink/downlink voice, telemetry, commands, data and television for the Space Shuttle. Domestic satellite relay equipment forwards these transmissions to Mission Control or other NASA Centers.

In addition, MILA is responsible for the operation of a smaller tracking station at Ponce de Leon Inlet, which is active only during Space Shuttle launches. The exhaust plume from the solid rocket boosters hampers Shuttle communications at KSC from T+1:00 to T+2:00. The Ponce de Leon station can "see" the Shuttle from a side angle, to fill this one minute communications gap.

Other equipment recently installed at the MILA site are antennas to communicate with two Tracking and Data Relay Satellites (TDRS), which will be launched next year on STS-6 and STS-8. In the future, spacecraft that are to use the TDRS system will be in contact with it through MILA while still on the ground, to verify compatibility before the launch. This includes the Space Shuttle.

The TDRS system can relay data from any satellite below geosynchronous altitude (22,240 miles above the equator), providing coverage for about 85 percent of most such orbits. This will replace most of the usual tracking from ground stations, which can provide support only when a spacecraft is within sight.

The Goddard STDN system, of which MILA is a member, will continue to provide tracking for satellites with highly elliptical orbits. These have an apoapsis, or high point, beyond the geosynchronous orbit of TDRS. An example of such a satellite is ISEE-3, with an orbit that has extended up to 900,000 miles from Earth.

The future for the MILA tracking station is a bright one. Because the TDRS system cannot relay Space Shuttle communications until T+8 minutes, after external tank separation, it will continue to function as the launch station for the Space Shuttle. The Delta and Atlas-Centaur vehicles are not TDRS-compatible, and MILA will serve them also.

During the fall of 1983, equipment from the Jet Propulsion Laboratory will be installed at MILA to support the Delta launch of the Active Magnetospheric Particle Tracer Explorer (AMPTE) spacecraft in 1984. This same JPL equipment will be used again for the Galileo Jupiter Orbiter/Probe and the International Solar Polar Mission, both scheduled for launch aboard the Space Shuttle in 1985.

During a period when other stations are cutting back to part-time or reduced hours operations, MILA continues to be a full-time 24-hour tracking facility. (SPACEPORT NEWS, 11-16-82, p. 2, Vol. 21, No. 23)

November 18: While the never-before-flown Shuttle Challenger is scheduled to move from its hangar to the Vehicle Assembly Building at 6 a.m. Saturday, the veteran spacecraft Columbia comes home to rest Monday afternoon.

The Columbia, which completed its fifth flight Tuesday, will be flown back to Kennedy Space Center by 12:30 p.m. Monday from Edwards Air Force Base in California, hitched on top of a 747 aircraft.

The 160-ton Columbia will get a major overhaul in preparation for its next flight in October 1983. On that mission a crew of six will crowd into the spacecraft and the European Spacelab will occupy the 60-foot-long cargo bay.

The move of the Challenger from its hangar has been delayed four days because of engineering tests. It will make its maiden voyage on the six Shuttle mission scheduled for January 24. (TODAY, 11-18-82, p. 16A)

<> The world's heaviest communication satellite, weighing 3,000 pounds more than the conventional variety, will take center stage in Space Shuttle Challenger's cargo bay.

The sixth Shuttle mission, now set to start with a January 24 launch from the Kennedy Space Center, will mark the beginning of a new generation of spacecraft.

The Tracking and Data Relay Satellite (TDRS) the Challenger will carry into space is part of a satellite system designed

to give engineers on the ground an around-the-clock link with future Shuttles.

After a second TDRS is deployed in July, the system should provide continuous voice and computer data transmission between Shuttle astronauts and Mission Control.

Because the satellites will orbit the Earth at 22,000 miles up, their signal will cover a wide area of the globe, keeping an electronic eye on both the Shuttle and a White Sands, N.M., tracking station.

Once the system is fully working, late next year, computerized information or astronaut voice signals will be beamed from the Shuttle -- at only 160 miles up -- to a TDRS. That signal will be beamed to the White Sands tracking station.

The White Sands station is a state-of-the-art information gatherer -- it could receive every letter and punctuation mark in a 140-volume encyclopedia every second, said Neville Barter, a spokesman for TRW, the satellite's manufacturer.

While the present array of ground stations scattered around the world in the Shuttle's patch can track about 15 percent of the spacecraft's orbit, two 5,000-pound TDRS's will raise that coverage to 85 percent, Barter said.

Harris Corporation, headquartered in Melbourne, manufactures the two 16-foot-wide gold antennas that unfold from the TDRS like umbrellas once it's deployed.

Aside from TDRS, the Challenger also will carry into space a powerful upper stage rocket designed to boost the satellite into its high-Earth orbit -- a tenth of the way to the moon and far beyond the Shuttle's reach. Four astronauts will fly the three-day mission, and they are expected to deploy the TDRS from the cargo bay only about eight hours after liftoff.

A Japanese snow-making experiment that will study zero-gravity crystal growth and a U.S. Air Force Academy canister of metals-processing instruments also will hitch a ride in the cargo bay. (TOLAY, 11-18-82, p. 16A)

<> Two Brevard businessmen, a Milwaukee man and their companies -- all accused of inflating or falsifying the costs of construction work at NASA - finished the second day Wednesday of what could be a six-week-long fraud trial in federal court.

The trial stems from a 20-count indictment issued in January against the men and their firms, which were doing subcontracting work at Kennedy Space Center. Federal prosecutor Ed Tomko of Washington, D.C., said the men inflated labor and equipment rates among other expenses in four years ending in 1979.

The men and companies accused are Arthur Boschen of Titusville, president of New World Construction Co.; James White Jr. of Melbourne, a former New World engineer; and Philip Akwa of Milwaukee, president of Capital Communication Corp. (TODAY, 11-18-82, p. 1B)

<> Critics of the sale of oil and gas leases off the Florida coast are enlarging on their complaints about possible dangers to the state's tourists and fishing industries.

They are joining in a warning by NASA that oil rigs along part of the Atlantic coastline could be endangered by booster rockets, fuel tanks and other falling debris from the Space Shuttle.

NASA wants the flight-clearance zone for Kennedy Space Center eliminated from the area the U.S. Department of Interior wants to open up for oil and gas exploration.

Some offshore-drilling opponents in six Florida coastal counties that would be affected, including Brevard, are considering whether to join NASA in its petition.

Brevard County Water Resources Director Bob Massarelli said his office is now reviewing the Department of Interior's environmental impact statement on the offshore leases but has not yet decided whether to recommend that Brevard join the opposition.

The matter probably will be brought before the county commission at its December 2 meeting, Massarelli said, before the scheduled December 7 public hearing on the leases in Daytona Beach. Massarelli said the extent of Brevard's participation in that hearing will depend on the commission's decision.

Massarelli previously has voiced concern about the "onshore" impact of the offshore drilling, saying the program would bring an influx of new workers to the area and strain current water resources.

Volusia County Council members will debate the issue at a council meeting in DeLand today.

Some officials in the other counties and from Governor Bob Graham's office have complained that offshore rigs would endanger the state's important tourist and fishing industries. One of the biggest fears is oil spills along the tourist beaches.

NASA's proposal would cut about a third of the 33 million acres of Atlantic Ocean bottom that Interior Secretary James Watt wants to open up for exploration in July.

NASA's flight-clearance zone extends from 12 to 130 miles offshore in an area stretching from Cape Canaveral north to near Brunswick, Georgia. It is off the coasts of Volusia, Brevard, Nassau, Duval, St. Johns and Flagler counties. (TODAY, 11-18-82, p. 1B)

November 19: NASA's John F. Kennedy Space Center has awarded a \$2,438,250 contract modification to the Federal Systems Division of International Business Machines Corporation, Cape Canaveral, Florida, for support of the Space Shuttle program.

This award is for additional services under an existing cost-plus-award-fee contract with IBM to provide systems engineering and software development services for the Launch Processing System (LPS) at KSC. This contract modification calls for IBM to develop techniques that will aid LPS users in developing applications software for a multi-flow, multi-vehicle environment and increasing launch rates.

IBM provides the detailed design, development, validation, configuration management, and maintenance of the LPS system software, which provides programming instructions to the sophisticated computer system used in the automated checkout and launch of Space Shuttle vehicles from KSC.

This contract modification is for the period from July 1, 1982, through September 30, 1983, and brings the cumulative value of the parent contract to \$88,352,204. (KSC RELEASE NO. 318-82, 11-19-82)

November 21: Seven of 10 Americans think the Space Shuttle program is a good investment for the country, according to a new Associated Press -- NBC News poll.

A majority also said they think the government is spending the right amount or not enough on the space program.

A plurality said the main purpose of the space program should be scientific exploration rather than national defense.

And the 1,583 adults in the nationwide telephone poll Monday and Tuesday were almost evenly divided over whether they would travel in outer space themselves if they had a chance. Men, however, were much more likely than women to say they would take a space flight. (TODAY, 11-21-82, p. 1A)

November 23: Philip E. Culbertson, who has been assistant for Space Transportation Systems in the Office of the NASA Administrator since 1979, has been named associate deputy administrator of the agency and given a special assignment to direct planning for development and operation of a U.S. manned Space Station or Space Platform.

In moving to the number three position in the agency, Culbertson succeeds Robert F. Allnutt, who has served in the post since mid-1978.

Allnutt, an attorney with an engineering degree, has been appointed to the newly-created position of deputy general counsel for policy review, where he will be responsible for

conducting a series of reviews of "the legal implications of major policy areas....." (DEFENSE DAILY, 11-23-82, p. 118, Vol. 119, No. 15)

- <> Merritt Island homeowners have taken another step toward preventing the manufacturers of the Space Shuttle's solid rocket boosters from building a booster cleaning plant on the island.

Merritt Island Executive Council Inc. officials, representing 18 homeowners associations, voted at their meeting last week to voice their disapproval of the proposed United Space Boosters Inc. plant site to NASA's Kennedy Space Center Director Richard Smith.

Executive Council President Jerry Shaw said he expressed that disapproval in a letter sent to Smith.

USBI announced in February tentative plans for an off-site plant for non-launch activities. Based at KSC, USBI has since leased 140 acres near the barge canal and obtained a conditional use permit to store hazardous waste on the site.

"The letter's purpose is to convince NASA that the proposed site is not the right place for the facility. We do not want it here," said Shaw, a lieutenant colonel at Patrick Air Force Base, employed by the Department of Defense Space Shuttle Support Systems Plans Division.

NASA officials say they haven't received the letter and Smith will be unavailable for comment until Wednesday at the earliest.

The homeowners' biggest concern is the hazardous chemicals that will be stored at the facility if it is established, Shaw said.

"In the event of an explosion you have an established residential area nearby that might be impacted," he said. "Then there's the risk of pollution and contamination."

USBI Deputy of Florida Operations Beauford Franklin and other company officials at KSC were unavailable for comment.

Franklin is scheduled to meet December 8 with the East Merritt Island Homeowners Association.

The chemicals would be cleaning fluids used to remove any fuel residue from rocket segments before they're shipped out of state for refurbishment, USBI spokesman Rick Smith said last week. Most of the wastes involved would be methane chloride -- used by dry cleaners -- and concentrated citric acid, he said.

Cape Canaveral Air Force Station now is where segments of the rocket boosters are cleaned, said NASA spokesman Hugh Harris.

Shaw said homeowners decided to send the November 19 letter to NASA's Smith because briefings received by the council from USBI established that NASA has the final decision on the facility's establishment and location.

NASA officials still are analyzing the situation and don't know that they would have the final say, according to NASA spokesman Rocky Raab. The USBI contract is administered by Marshall Space Flight Center in Alabama -- not KSC, Raab said.

Shaw said he first brought the proposed plant to the attention of Sue Ford, president of the East Merritt Island Homeowners Association, when he saw USBI's application for a conditional use permit on the county Planning and Zoning Department agenda.

An East Merritt Island Homeowners Association newsletter distributed earlier this month carried an article saying that USBI will store "hazardous waste" on land along the barge canal between Hall Road and SR3.

"Not true," said USBI's Smith in response to the newsletter.

He said the firm will not store hazardous wastes on the Merritt Island site -- if such a site is chosen.

Wastes instead would be stored temporarily -- up to 30 days -- before being removed from the premises, Smith said. All wastes will be disposed of by a federal and state licensed contractor, he said.

USBI hired local engineers from Stottler, Stagg and Associates to prepare site evaluations and plans for a proposed Merritt Island plant. No information on preliminary architectural plans or proposed infrastructure have been made available by the company or the architectural firm.

Engineer Malcolm McLouth, in charge of the project, was unavailable for comment as he is out of the country.

A rough-draft map of the proposed site shows 200 acres bordered on the east by NASA property, unused land on the west, Madison Avenue on the north, and a barge canal access to the south.

USBI's Smith stressed the Merritt Island plant is only one of several alternatives. There are no other Brevard County sites being considered, Smith said. But additional space for USBI might be found on undeveloped KSC property, he said. (TODAY, 11-23-82, p. 2B)

<> Space Shuttle Columbia, hitched to the spine of a 747 aircraft, made an early return to Kennedy Space Center Monday afternoon.

Columbia was to be moved into its hangar around 6 a.m. today -- 2 1/2 hours after Shuttle Challenger was to be towed out of the hangar and into the Vehicle Assembly Building. Challenger, which will be flown in January on the next mission, has had some trouble getting out of the gate because of faulty hydraulic lines in a landing gear.

The former United Airlines 747, with its valuable cargo on top, touched down in a trail of dust at the space center's three-mile runway at 12:14 p.m. About 200 space center employees and their families braved the mosquitoes and crowded onto a small field near the runway in what's become a high-tech bird-watching tradition.

"It doesn't get old to me. I'm still as excited as the first time," said Velma Keene of Satellite Beach, who came equipped with a lawn chair and camera.

Although Columbia looks a bit worn, it still has a long life ahead, said Bill Williams, Columbia vehicle manager.

"It's beginning to look like a used spacecraft, like the ones in the Hollywood movies -- like 'Star Wars,'" Williams said.

The double-decker flying machine of 747 and spaceship left Kelly Air Force Base near San Antonio at 9 a.m. after pilots found clear weather along the 1,200 mile path to Florida.

The decision to fly was made an hour before takeoff.

A storm front Sunday in the Texas area had threatened to delay the flight as much as two days. Sunday morning, the Columbia-747 duo left Edwards Air Force Base, California, where the Shuttle ended a five-day mission November 16.

With five flights under its belt, Columbia will be retired for nine months before its next flight -- carrying Spacelab and a crew of six into orbit.

John Young, commander of the first Shuttle flight in April, 1981, will sit in that seat during the Spacelab mission.

Modifications to the spacecraft include greater accommodations for the bigger crew, a small kitchen, installing the barrel-shaped Spacelab and more powerful main engines.

Williams said he is confident Columbia will be flight-ready.

Columbia's major problem on the fifth flight was damage to the left main brake upon landing at Edwards.

"It locked up the last 50 feet or so of rollout, scuffed the tire and caused a leak," Williams said. But he added that a modification of the braking system will be made.

Late Monday afternoon, Columbia was gingerly hoisted from atop the 747. From there, Columbia was to be towed to its hangar.

Challenger will carry satellites into space for the next three Shuttle missions through October 1983. (TODAY, 11-23-82, p. 1A & 12A)

November 26: They are esteemed workers at all times -- but for several days before and during the launch of STS-5, they were given special honors and privileges.

The KSC Civil Service and contractor employees were the latest group of launch honorees to be recognized for their outstanding and individual contributions to the space program.

The honorees were guests of honor at a reception held at the Visitors Center, giving them a chance to get acquainted with NASA Administrator James Beggs, KSC Deputy Director George Page and several members of NASA's astronaut corps.

Following a special tour of Launch Complex 39, they were treated to a VIP site view of the fifth mission of the Space Transportation System.

The following are the employees commended for their dedicated service to the nation's space program.

NASA: Mark Schlomer, Clarence Lasure, Karon Witcomb, Norman Carlson, Thomas Feaster, Shirley Green, James Lane, Bill Study, Vincent Guttuso, Ralph Rice, Captain Edward Serine.

The Bionetics Corp.: Mark Provancha, Dieter Schiefner.

Expedient Services, Inc.: Jessie Walls, Sr.

IBM Federal Systems: Thomas Akridge.

Martin Marietta Aerospace: John Thompson.

CCMS Production Operations, Martin Marietta Aerospace:
William Nixon.

McGregor & Werner, Inc.: Sandra Burris.

Planning Research Corp.: Bemis Tatem, Jr., Suzanne Bassett, John Smith, Jr., Ernest Tholke.

TWA Services, Inc.: Ella Stucky.

Unified Services, Inc.: James J. Washington.

United Space Boosters, Inc.: Grant Witters.

Wackenhut Services, Inc.: Lillian Stubbs.

Wiltech Corp.: Thomas Owen.

Computer Sciences Corp.: Marguerite Law, James Ward, Jr.,
Thomas Eastham.

Rocketdyne: Barbara Cisco.

Rockwell International Corp.: Lawrence Mullen, William
Cheatham, Jr., Theresa Clover, Linda Beck, Walter
Antoniewski, Harold O'Dell, Calvin Rose, Forrest Rooker.

Boeing Services International, Inc.: Arthur Gordon, Marilyn
Dunfee, Murin Whitener, Adelbert DeWees, Robert Osborne,
Anne Pantano, Stanley Starr.

McDonnell Douglas Technical Services, Co., Inc.: W.L.
Robinson, Wendy Dankovchik.

Pan American World Airways, Inc.: Joanne Helton.
(SPACEPORT NEWS, 11-26-82, p. 1, Vol. 21, No. 24)

November 29: Space shuttle workers here moved the orbiter Challenger to the Vehicle Assembly Building November 23 to mate it with the external tank and solid rocket boosters in preparation for its first space flight and the sixth in the shuttle series.

A number of minor problems in cockpit systems and main landing gear hydraulics delayed the move that had been planned for November 17. (The) National Aeronautics and Space Administration wants to stack the shuttle system and move it to the launch pad November 29 for a flight readiness firing of its three main engines before Christmas. A date of December 21 is the target for this firing.

The main engines had been a pacing item in the schedule. The third engine completed its 500-second test at National Space Technology Laboratories in Mississippi, October 31. It arrived here November 10, shortly after the liftoff of the orbiter Columbia on its fifth mission. These engines are qualified at 104% of rated thrust. Engines in Columbia

are qualified at 100% thrust, which is 375,000 pounds each at sea level. (AVIATION WEEK & SPACE TECHNOLOGY, 11-29-82, p. 72, Vol. 117, No. 22)

- <> NASA has selected EG&G, Inc., of Wellesley, Massachusetts, for negotiation of a contract to support base operations at the Kennedy Space Center.

The cost-plus-incentive/award fee contract will be for an initial period of one year, plus two priced one-year options and seven unpriced one-year options, for a total potential period of 10 years.

EG&G's proposed cost for the initial three-year period is approximately \$193 million.

The base operations work contract will be the first of three comprehensive contracts to be awarded to strengthen the Space Transportation System launch function. The contract will consolidate institutional and certain technical support services now provided by 14 different contractors into a single mission contract covering utilities, facilities, administrative services, technical operations and health and safety services.

EG&G, Inc., proposes to utilize a work force predominantly composed of employees of incumbent contractors currently performing the same or similar work at Kennedy.

The contractor will also establish and maintain a retirement benefits plan that will be transferable to any future successor contractor. This is a unique feature, requested by NASA, which is intended to stabilize pension opportunities for base operations contract employees. The contractor also proposes a significant goal for small and small disadvantaged business opportunities.

Requests for proposals were originally mailed to 48 companies and 69 additional companies requested copies of the RFP. In addition to EG&G, Inc., proposals were also received from:

* BENKO Joint Venture (Bendix Field Engineering; Wackenhut Services, Inc.; Planning Research Corp.; and Computer Sciences Corp.), Cape Canaveral.

- Boeing Services International, Cocoa Beach.
- Lockheed Engineering and Management Services Co., Inc., Houston. (SPACEPORT NEWS, 12-10-82, pp. 1 & 6, Vol. 21, No. 25)

<> (The) Interior Department has refused to exclude about 10 million offshore acres of the Atlantic Ocean floor from oil and gas exploration despite a National Aeronautics and Space Administration plea that it needs this area for space shuttle operations. The area NASA wants excluded is fan-shaped and extends to a maximum distance of 195 nautical miles from the Kennedy Space Center. (The) lease of approximately 33 million acres of Atlantic ocean floor from 28-37 degrees North Latitude has been proposed for next July by Interior Secretary James Watt. NASA is protesting that the zone it wants excluded includes the normal drop area for recoverable solid rocket boosters and that the external tank could be jettisoned there in a launch abort. (AVIATION WEEK & SPACE TECHNOLOGY, 11-29-82, p. 15, Vol. 117, No. 22)

November 30: EG&G isn't a household name at Kennedy Space Center. In fact most space center employees have had little dealings with the company that will sign about 1,900 paychecks starting next year.

When stacked up against aerospace giants like Lockheed and Boeing, EG&G is the runt of the litter. In comparison, Boeing recorded about \$9 billion in sales last year while EG&G reported \$704 million in sales for 1981.

But when it came time Monday for NASA Administrator James Beggs to choose a company to operate and maintain Kennedy Space Center -- a three-year contract worth \$193 million -- he picked EG&G.

Based in Wellesley, Massachusetts, EG&G is a diversified high-technology firm that has been making precision instruments for more than 30 years. The company is no newcomer to dealing with the government -- to date having managed more than \$6 billion in government programs.

With 18,000 employees, Fortune Magazine ranked EG&G 428th in sales among the 500 largest companies.

Founded in 1947, EG&G has no single predominant product line. But it has had a reputation in the weapons' business.

In its defense contracts, EG&G has built electronic components for weapons systems and the company's Special Projects Division is now working on a new combat system for attack Submarines.

EG&G works closely with the government's national weapons laboratories and the company's Energy Measurements Group furnishes instruments for use in the underground nuclear bomb tests in Nevada.

In its early years, EG&G was almost exclusively a government contractor dedicated to weapons research, according to the company's 1981 annual report. "And though names have changed and missions broadened, the company's role in the nation's nuclear weapons programs continues to be important," the report reads.

Two areas where EG&G has diversified are in biological and energy research. The company manages the Idaho National Engineering Laboratory for the Department of Energy and is involved in synthetic fuels and hydro-electric power research.

EG&G Mason Research Insitute at Worcester, Massachusetts, is a center for cancer and poisons studies. (TODAY, 11-30-82, p. 12A)

DECEMBER 1982

December 1: Space Shuttle Challenger, cutting through the pre-dawn fog like an apparition, made its way to the launch pad Tuesday.

The fully assembled Shuttle, 12,000 pounds lighter than its predecessor Columbia, completed a 3-mile ride from its hangar to launch pad 39A by 10:35 a.m.

By the Christmas holidays, engineers are scheduled to test fire Challenger's three main engines and the Shuttle's payload should be stowed inside the cargo bay by the first of the year, said Jim Ball, NASA spokesman.

A crew of four astronauts will spend three days in space during the sixth mission -- their primary duty to deploy into orbit the largest communication satellite ever.

Called TDRS, the satellite is part of a network designed to provide continuous radio and data relays between the ground and future Shuttles.

"By then (the test firing), we should firm up the launch date," Ball said. Liftoff is tentatively scheduled for January 24.

Challenger is a far lighter Shuttle than Columbia, now in its hangar for a nine-month tuneup and renovation.

Challenger's peach-colored fuel tank is 6,000 pounds lighter, the two booster rockets weigh 4,000 pounds less and the Challenger spacecraft itself is about 2,000 pounds lighter than Columbia, Ball said.

Putting the Shuttle on a weight-reduction program is part of NASA's overall plan to increase the spacecraft's carrying potential.

The Shuttle began its journey over a bed of crushed Alabama river rock at 4:19 a.m.

The 184-foot-high spaceship was propped on a steel-gray mobile launch platform.

This platform recently was refurbished from its last mission -- the 1973 launch of Skylab. (TODAY, 12-1-82, p. 1A)

December 2: PRC Systems Services Co. and the architectural and engineering firm Briel, Rhame, Poynter and Houser Inc. will design ground support equipment for Launch Pad 39-B at the Kennedy Space Center under a \$5.9 million NASA contract.

PRC and BRPH will pursue the project in a joint venture. The contract period began November 22 and continues to June 30, 1983.

Pad 39-B was last used in the Apollo space program. It is being modified for use by the Space Shuttle and the necessary work is expected to be completed in early 1986. Thus far, all Space Shuttle launches have been from Pad 39-A, for which both PRC and BRPH designed support equipment and modifications under earlier NASA contracts.

The new contract calls for such items as components to regulate and distribute gases and propellants to the launch pad, a fuel cell servicing system and electrical control panels for the liquid oxygen and hydrogen systems. (TODAY, 12-2-82, p. 16C)

<> When TODAY published the news Tuesday that the new contract to operate the Kennedy Space Center for the next three years will go to EG&G Inc., our switchboard received many calls from readers asking what the initials represent. That shows how little is known about the company that beat out such familiar Space Coast names as Boeing, Pan American and Lockheed.

But EG&G (Edgerton, Germeshausen & Grier) is no "Brand X" firm blindly drawn from a hat. It is a diversified, high-technology engineering and weapons company with an outstanding track record for efficient management and security operations of major federal facilities.

We believe the selection of this firm, personally approved by NASA Administrator James Beggs, signals a move by the space agency to tighten the management of its operations -- to get the job done better and for less cost. That's a sensible move, because unless NASA does a better job of cost cutting in routine operations, it is likely to have a much harder time getting funding in the future to undertake costly new ventures in space such as building a permanent space station.

There probably are few people living in Brevard who haven't heard stories from friends who work at KSC about the waste and inefficiency that frequently has occurred in some operations there.

It will be EG&G's task to trim costs in operating the space center's security, fire control, janitorial services, water, sewer and heavy equipment. Expectations are that more than 200 contractor employees will be trimmed from the workforce at KSC by the end of next year. Even though we don't like to see workers lose their jobs, we can't argue with a move to trim excess positions from a tax-supported payroll. It is not unreasonable to expect that a streamlined operation under tight management will be able to turn in equal or better performance.

EG&G, a Wellesley, Massachusetts-based firm, will receive \$193 million for its three-year contract. A couple of important factors that apparently influenced NASA to select this firm were its record of success in operating high-security military facilities and its demonstrated ability to reduce labor-management tensions. There will be a need for enhanced security at KSC in the future, as Space Shuttle operations move into new operational phases.

We congratulate EG&G for its successful bid and we applaud NASA's realization of the need to tighten the management of its major operations. (TODAY editorial, 12-2-82, p. 14A)

December 3:(Brevard County) commissioners decided to back NASA in its opposition to oil and gas exploration off Port Canaveral.

NASA has asked the federal government to drop its plans to sell oil and gas drilling leases on about 11 million acres of Atlantic Ocean floor within the Kennedy Space Center's flight clearance zone.

NASA officials fear that Shuttle components, such as the solid rocket boosters, would face possible damage if they struck an oil rig during a launch.

The rocket boosters are jettisoned into the ocean shortly after liftoff.

In an emergency the craft's external tank also would be dumped into that area. On a successful mission, the external tank stays on the Shuttle until it climbs 64 miles into the atmosphere, where the tank disintegrates.

County officials say another major reason they want to support NASA is because the ocean floor is vital to the county's scallop industry -- which also lies within the flight clearance zone.

If NASA succeeds in getting the area cut from the 33 million-acre lease sale, the scallop beds would be protected from any ill-effects of oil and gas drilling, officials said. (TODAY, 12-3-82, p. 2B)

December 5: A top official of United Space Boosters Inc. says he expects NASA to approve plans for a Shuttle-related plant on Merritt Island within three weeks, despite opposition from island homeowners.

NASA will have no comment until a decision is made, said Fletcher Reel with the federal agency in Washington, D.C.

An association of homeowner groups is opposing the plant because it fears the facility will house permanently potentially hazardous chemicals.

If approved, the plant would employ 850 workers and create 350 local jobs for skilled, semi-skilled and maintenance workers by 1985, said Frank J. Lavacot, USBI executive vice-president. The new location would allow USBI -- now housed in three buildings at Kennedy Space Center and Cape Canaveral Air Force Station -- to set up a consolidated, more efficient assembly-line layout, he said.

USBI is under a KSC contract to build the Space Shuttle's solid rocket boosters....

KSC's Smith said the same NASA safety regulations at the space center will apply at the off-site USBI facility.

Likewise, state Department of Environmental Regulation standards will be the same, said DER spokesman Cliff Miller.

Miller cited only one difference between regulations in the county's conditional use permit and DER's hazardous waste registration. The county's permit allows short-term storage of wastes for up to 30 days. USBI has registered with DER as a generator of hazardous wastes, which allows storage of hazardous wastes for up to 90 days.

County environmental planner Stephen Pepper said DER-enforced federal regulations would supercede the county's conditional use permit.

Regardless, Lavacot said USBI will not store any chemicals or wastes for more than 30 days and quantities will not exceed in any given month: 10, 55-gallon steel drums of perchlorethylene, two drums of methylene chloride and 4 gallons of citric acid.

USBI is awaiting final DER permits to dig out a basin next to the facility to accommodate transport barges and to sign a lease with Port Canaveral for an easement, Lavacot said.

A draft map of the entire site shows 200 acres bordered on the east by NASA property, unused land on the west, Madison Avenue on the north and a barge canal access to the south. The site is about eight-tenths of a mile from the nearest established residence in Ridge Manor. That house also is separated from the property by the Barge Canal. (TODAY, 12-5-82, p. 2B)

<> EG&G is pleased to announce that it will soon join the team at Kennedy Space Center as Base Operations Contractor.

During the ensuing weeks, we will begin to establish ourselves in the community. Our highest priority is to proceed to accept our new responsibility without disruption to the current shuttle program, to retain current employees to the maximum extent possible and to allay as rapidly as possible the natural uncertainty which accompanies any change as dramatic as the announcement of the BOC.

Within the next few days, additional information concerning employment opportunities, community and work force briefing sessions and a general schedule of events for the 30 day period, will be forthcoming.

Our desire is to become an effective and respected member of your community. Please accept our sincere apology for any inconvenience and uncertainty to which you may be subjected during this brief transition period.

EG&G Florida, Inc.
P.O. Box 1440
Cocoa Beach, Florida 32931

(TODAY, 12-5-82, p. 9A)

December 7: Wackenhut Services, Inc., of Coral Gables, Fla., has been awarded a \$1,383,711 extension of its contract with NASA to provide services at the Kennedy Space Center.

This new award brings the total contract value to \$51,734,632, and covers the period from December 1 to December 31, 1982. Under the terms of the contract, Wackenhut is to furnish security, law enforcement and fire protection and rescue personnel at KSC. Wackenhut is also to provide plant protection and fire prevention programs for employees at the center. (KSC RELEASE NO. 326-82, 12-7-82)

<> NASA's John F. Kennedy Space Center has awarded Boeing Services International, Inc., Kennedy Space Center, Fla., a \$2,581,363 extension to an existing contract. This contract extension is an exercise of an option for work functions which will eventually be transferred to KSC's base operations contract (BOC). The base operations contract will consolidate institutional and support services now provided by 14 different contractors at the Space Center. EG&G, Inc., of Wellesley, Massachusetts, was recently selected for negotiations that will lead to the award of this contract.

Under the terms of the new contract extension, BSI will provide certain institutional support services, which includes utilities, facilities and some technical operations, for a one-month period.

This new cost-plus-fixed-fee extension covers the period from December 1 through December 31, 1982, and brings the total value of the contract to \$314,189,908, since its inception in July, 1977. (KSC RELEASE NO. 324-82, 12-7-82)

December 8: A recently completed commercial building in Cocoa has become the local headquarters for EG&G Inc., the firm that has the \$193 million task of operating the Kennedy Space Center.

Reed H. Duncan, owner of the building at 950 N. Cocoa Boulevard, said Tuesday that EG&G is quickly setting up shop in the 3,800-square-foot facility.

Duncan and EG&G representatives were negotiating a rental agreement last week and came to terms Friday night. Monday the furniture began arriving. "It was unreal," Duncan said. "Yesterday (Monday) they moved all their equipment in. They had their phone in and their electrical people in."

"These people are in a hurry. They moved 40 desks in yesterday, all their copying machines and their typewriters," Duncan said. EG&G's Space Center operations actually begin early next year, but there is plenty of preparation to do now.

Based in Wellesley, Massachusetts, EG&G has promised NASA it will cut the center's operating costs in the areas of fire control, security, janitorial services, utilities and heavy equipment. The company beat such giants as Boeing and Lockheed to win the initial three-year contract. (TODAY, 12-8-82, p. 14C)

December 9: More than 200 local homeowners -- concerned about a space firm's proposed Merritt Island plant -- finally met Wednesday with United Space Boosters Inc. officials.

It was evident from questions at Wednesday's meeting that fear-fetching rumors about the plant for non-launch activities still ran rampant. But the orderly crowd responded with laughter when one near-hysterical woman compared the future situation with New York's "Love Canal" disaster.

Space-related industry is not a sin in the eyes of many islanders who are employed by Kennedy Space Center, but they aren't sure this off-site location is safe. Most of the questions from the floor were from those KSC workers well-versed in the language. Talk was technical.

Homeowners oppose the plant primarily because its operation will involve hazardous waste storage.

The chemicals that will be on-site -- primarily methylene chloride and perchlorethylene -- are solvents used by USBI to remove any fuel or cleaning residue from forward thrust and parachute control sections of the boosters, according to USBI spokesman Rick Smith.

The chemicals are or aren't suspected carcinogens -- depending on who's doing the talking.

DER spokesman Cliff Miller, who is responsible for inspection of all hazardous waste storage at KSC, said standards will be the same and he would inspect the Merritt Island site at least once a year.

USBI executive vice president Frank L. Lavacot said USBI will not store any chemicals or wastes for more than 30 days and quantities will not exceed in any given month: 10 (55 gallon steel) drums of perchlorethylene, two drums methylene chloride, and four gallons of citric acid.

USBI said last week NASA approval of a north Merritt Island facility for non-launch operations should be forthcoming before the year's end.

If approved, the plant would employ 850 and create 350 local jobs for skilled, semi-skilled and maintenance workers by 1985, said Lavacot. It will allow USBI, now housed in three different facilities at Kennedy Space Center and the Air Force Station, to set up a consolidated, more efficient assembly-line layout, he said.

Building a suitable single facility and having easy access to all operations will be cost-effective, Lavacot said. He estimated a savings of \$400,000 per Shuttle flight.

Lavacot said USBI will develop only 39 of the 130 acres it has an option on. Construction of the proposed plant and related facilities will take about two years, according to Bernard A. Cocchi, USBI vice president of operations. If USBI went through NASA for a KSC site, it would take an additional two years, he said.

USBI is awaiting final DER permits to dig a basin next to the facility to accommodate transport barges and signing a lease with Port Canaveral for an easement, Lavacot said.

Residents are also concerned with another dead-end canal, which they say will hurt water quality. Application for DER's dredge and fill permits has been made, Lavacot said. But permits won't be available until completed buildings are approved. (TODAY, 12-9-82, p. 2B)

December 10: Rockwell International Corporation has formed a new Shuttle Launch Operations Division that will pursue the NASA contract for the launch and turnaround operations of the Space Shuttle, the company announced Thursday.

A new division, to have its headquarters in Cocoa Beach, intends to conduct its activities both at Kennedy Space Center and at Vandenberg Air Force Base in California. Richard Schwartz will be the vice president and general manager of the division and will report directly to the president of Rockwell's Space Transportation and Systems Group.

Rockwell intends to seek the upcoming NASA contract for the preparation, launch, landing and servicing of the reusable orbiter. That contract, worth a potential \$2.7 billion to the private company selected, is a necessity to achieve cost savings, now that the Shuttle program is in its operational phase.

The spacecraft itself is manufactured by Rockwell International at its Palmdale, California, plant. Rockwell spokesman Robert Gordon said the company is confident that

the experience and the efficiency it achieved in past Shuttle activities will give it a competitive advantage in the race for the NASA contract.

Rockwell is not without competition. Last month, Lockheed Corporation announced the formation of the Lockheed Space Operations Company, a new division based in Titusville. Lockheed has a working agreement with Grumman Aerospace, Pan American Airlines and Thiokol Corporation to unite their efforts in seeking the processing contract.

A similar team effort combines Rockwell with Boeing Services International, Martin Marietta, United Space Boosters Inc. and United Airlines. That lineup was unveiled in November and, with the exception of United Airlines, all have current NASA contracts for launch work and processing at KSC.

NASA is expected to issue a request for proposals in January, a formal soliciting of plans from the various competitors outlining how they intend to provide the needed services. The actual awarding of the contract is scheduled for late 1983.

The Rockwell Shuttle Launch Operations Division initially will be comprised of three basic elements -- Rockwell's KSC Launch Operations that does Shuttle processing work now, Rockwell's Vandenberg AFB field operations and the Shuttle contract proposal team effort.

Establishment of the new division was announced by Rockwell Space Operations President George Jeffs. (TODAY, 12-10-82, p. 16C)

<> NASA's John F. Kennedy Space Center has awarded Atlantic Technical Services of Longwood, Florida, a small business firm, a \$110,406 contract extension to provide mail and distribution services at KSC. This award brings the cumulative value of Atlantic's contract with NASA to a total of \$2,751,813.

The contract covers the period from May 1, 1980 through December 31, 1982. (KSC NEWS RELEASE NO. 329-82, 12-10-82)

<> A proposed reorganization of the Kennedy Space Center designed, "...to carry the center into the operations era," has been announced by Center Director Dick Smith.

Key management officials were detailed to their new jobs effective December 1.

The most significant change, Smith said, in a letter to Center employees, is combining project management and operations in one organization, in the case of both shuttle vehicle and cargo. "This change...anticipates and prepares for multiple flow, contract self-sufficiency, and a changed civil servant management approach."

Four major directorates emerge from the new organization, Shuttle Management and Operation under Thomas E. Utsman; Center Support Operations, under Robert G. Long; Cargo Management and Operations headed by Thomas S. Walton; and Engineering Development under Peter A. Minderman. Portions of the former Technical Support Directorate were transferred to the Shuttle and cargo organizations.

Smith said that although the restructure has not been formally approved by Headquarters, that key officials have been briefed and agree with the approach he is recommending. He said he was detailing the KSC managers to the new positions at this time in order to minimize the time required to implement the new structure.

"I also am establishing a new position on my staff titled Associate Deputy Director," Smith said. "The primary function of the position will be to assist George Page and me in the smooth and efficient transition to the Shuttle operational era." Andrew J. Pickett will fill the new position.

Smith emphasized that there is sufficient work for the KSC work force for the foreseeable future and, consequently, there are no planned large reductions in the KSC civil service population.

"I believe we will be taxed to the limit to accomplish the tasks assigned to us," he said. "We must all continue to seek ways to do our jobs better, become more productive, and institute cost and manpower savings wherever practical." (SPACEPORT NEWS, 12-10-82, p. 1, Vol. 21, No. 25)

<> The awesome thrill of fiery launch on November 11 passed and the STS-5 mission proceeded on schedule with the successful deployment of the shuttle's first two operational payloads -- communications satellites for Satellite Business Systems and Telesat Canada.

Columbia, reflecting the gold of a rising sun, swept down from the heavens and made a pinpoint landing on a paved runway at NASA's Dryden Flight Research Facility on Edwards Air Force Base in California's Mojave Desert at 6:33 a.m. PST on November 16.

Waiting for Columbia's landing -- described as "as light as that of a butterfly with sore feet" -- was a KSC recovery convoy deployed into position near the runway at 4:25 a.m. PST. The convoy consisted of the specialized vehicles and about 100 personnel needed to safe and service the spacecraft, exchange flight for ground crews, and tow Columbia to the Mate/Demate Device at DFRF to be prepared for the ferry back to KSC.

Also waiting for Columbia's landing was a turnaround crew of about 200 NASA and contractor personnel flown into Dryden from KSC aboard a chartered DC-10 the previous afternoon.

The seven-mile tow from the end of the runway back to Area A at DFRF began 1 hour, 35 minutes, after touchdown and was completed within 3 hours, 48 minutes, despite concern over a pressure decay in the left inboard main tire which had locked for a brief interval during Columbia's 9,553-foot landing rollout.

"Every major milestone in the convoy operation established a new record," observed Bill Williams, Convoy Commander. The crew hatch was opened within 24 minutes of landing, ground cooling was activated within 26 minutes, the flight crew left within 34 minutes, and the tow began 25 minutes ahead of schedule.

Landing was on a Tuesday morning and the light turnaround timeline called for the 747 Shuttle Carrier Aircraft to begin the two-day ferry flight back to KSC the following morning.

Would that schedule be met?

Asked that question during a news conference at DFRF the day after landing, KSC Ground Operations Manager Jim Harrington predicted that it would. He reminded the press that a similar schedule had been faced during the turnaround at STS-4 in July and had been successfully accomplished.

"We're just getting better at it," Harrington observed.

Work continued around the clock through the week and, despite high winds and cold night temperatures, the timeline was met. Right on schedule, the SCA, with Columbia riding piggyback on top, taxied onto the Edwards AFB runway and took off with KSC as its destination at 7:33 a.m. PST on Sunday, November 21.

After an overnight stop in San Antonio, Texas, the SCA took off again and landed at KSC to complete the final leg of the trip at 12:14 p.m. EST on Monday, November 22.

Summarizing the success of the operation, Harrington noted: "Undoubtedly, it was the best turnaround we've ever had. Everyone did a great job. This was the fifth time the team had done this and we had no major problems to interfere with our schedule. Everyone knew their job and went out and did it."

The Dryden to KSC turnaround -- like shuttle missions -- have become routine operations. (SPACEPORT NEWS, 12-10-82, pp. 4 & 5, Vol. 21, No. 25)

December 13: Space Commerce Act:

Congressman Akaka (D-HI) introduced H.R. 7411, to streamline the current procedure by which a private company is granted permission to launch a vehicle into space; the measure was referred to the House Science and Technology Committee.... (OFFICE OF LEGISLATIVE AFFAIRS, LEGISLATIVE ACTIVITIES REPORT, 12-13-82, Number 150)

December 14: Federal prosecutors said Monday two companies and their presidents failed to tell NASA officials who was really performing the work in two Shuttle-related contracts.

During closing arguments of a 4-week-old fraud trial, prosecutor Ann Arbor told the 12 jurors and four alternates that the Chicago-based Mayfair Construction Co. -- through its Kennedy Space Center contractor Capital Communication Corp. -- was supposed to be the prime contractor on the two projects.

However, New World Construction Co. of Titusville actually supplied all the labor and equipment, she contended. Capital president Phillip Akwa of Milwaukee served a sort of a middleman, Arbor claimed, reaping a profit on the work New World performed.

The trial in U.S. District Court in Orlando stems from a 20-count indictment issued in January against Capital, New World and three men.

Capital, Akwa, New World and its president, Arthur Boschen, all are accused of five counts of making false statements to the federal government.

In addition, Akwa, Boschen and New World engineer Thomas White, Jr. of Melbourne are accused of conspiring as early as 1976 to defraud the U.S. government, Arbor said. The three also are charged with two more counts of making false statements.

Akwa and Capital Communications are being tried on another count of making a false statement and submitting a false claim. However, 10 additional charges against Akwa and Capital will be considered in another trial.

Each count carries a maximum penalty of five years in prison or \$10,000 fines or both. The men have been free on bond.

According to the contract, Mayfair should have performed at least 20 percent of the work on a structural steel project inside the Orbiter Processing Facility and 30 percent of the work on a project to renovate the mobile launch pad for Space Shuttle use, said U.S. prosecutor Ed Tomko.

But Boschen and Akwa went to elaborate lengths to keep NASA unaware that New World was actually supplying all the equipment and labor, Arbor said.

Although the workers received their paychecks from Mayfair, New World Construction was to reimburse Mayfair for the payroll expenses, she said. The full extent of New World's contract with Mayfair also was hidden from NASA, prosecutors said.

Akwa and Capital were entitled to up to 40 percent of the profits on the NASA contracts by Mayfair, Tomko said, but would also bear up to 40 percent of the losses.

By the end of 1977, work on the Orbiter Processing Facility and Mobile Launch Pad was almost finished, Tomko said. The pad project in particular experienced tremendous cost overruns, he said.

But there was no way for Akwa and Capital to recoup their losses through change orders -- amended costs for unanticipated work on a contract -- because they had no equipment or labor expenses.

Instead, Akwa allegedly inflated New World's cost proposals to add a margin of profit, Tomko said. (TODAY, 12-14-82, p. 1B)

<> NASA officials are investigating how a rocket nose cone, being carried on a tractor-trailer, snapped two high-voltage power lines Friday at Kennedy Space Center.

A space agency board formed Saturday will determine if the 20-foot-high, fiberglass nose cone was damaged when it hit the wires and if the February 10 launch of an international communications satellite, INTELSAT 5, will be delayed, said Hugh Harris, NASA spokesman.

The million dollar cone, called a nose faring, is designed to fit over and protect the \$30 million satellite during launch.

The nose faring was being moved five miles from Launch Pad 36, where it underwent tests, to a satellite assembly building where it was to be attached to the INTELSAT 5.

No injuries were reported in the 5:30 p.m. accident, and the wires were cleared so the nose faring could complete the trip. Repair of the two 13,000-volt lines that supply power to the pad was proceeding smoothly, Harris said.

The investigation board, headed by Billy Childers, chief of NASA's technical division support at KSC, was formed Saturday to determine the cause of the mishap and the extent of the damage.

INTELSAT 5, owned by a consortium that includes the United States and 105 other countries, will provide both land and maritime telephone communications. (TODAY, 12-14-82, p. 16A)

December 16: The Committee to Save Sykes Creek claims Merritt Island again is facing a threat to its water quality -- this time from a proposal to dig a basin for boats to turn around in the Barge Canal.

United Space Boosters Inc. is seeking state permission to dredge the turning basin so that boats can carry Space Shuttle booster parts to a site just north of the Barge Canal for refurbishing.

But committee Chairman Bob Sampson said the basin might harm water quality in the Barge Canal and, to a lesser degree, nearby Sykes Creek.

The basin's impact on water quality would be similar to that of the man-made canals currently creating a problem for Sykes Creek, Sampson said.

Sunlight wouldn't reach the bottom of the proposed 14-foot-deep turning area, cutting the level of dissolved oxygen in the water, Sampson said. Dissolved oxygen is what fish and other aquatic animals need to breathe.

Because of the committee's concerns, officials from USBI and the state Department of Environmental Regulation will meet with committee members Friday.

USBI needs a DER permit to dredge the canal to build the turning basin, said Lee Miller, assistant DER district manager for the area that includes Brevard.

DER has announced it plans to grant USBI a dredge-and-fill permit for the job, which DER officials consider environmentally safe, Miller added.

If committee members aren't satisfied Friday that the dredging would be safe, they may request a formal hearing on DER's decision to issue the permit.

Sampson said the committee will ask that the turning basin not be constructed and that trucks rather than boats carry the booster parts to and from the proposed site of the refurbishing plant.

But USBI officials say they would need to build a new road to return the booster parts to Kennedy Space Center once they are reassembled because SR 3 -- the road that connects the site to KSC -- can't be used.

When reassembled, the three parts that would be refurbished at the site of south of KSC stand 26 feet tall -- too tall to clear the overpass at the NASA Causeway and SR 3, Rick Smith, USBI spokesman. The reassembled parts can't be placed on their side on a truck bed because of their sensitive electrical equipment, Smith added.

The barge would travel to KSC from the site by traveling east on the Barge Canal and then north on the Banana River. This would be far less costly than constructing a road to KSC, he added.

The three parts to be refurbished at the proposed site just north of the Barge Canal are the frustrum and forward and rear skirts, Smith said.

The portions of the booster rockets that contain fuel would be left at KSC after the rockets are retrieved from the ocean and disassembled at the space center, he said.

If USBI officials insist the turning basin is needed, Sampson said, the committee will suggest its size and depth be reduced from what USBI proposes in its dredge-and-fill ocean.

Rather than needing a turn basin for a large ship, USBI plans now require a basin only large enough for the barge that will carry partially assembled boosters, Smith said.

In contrast to committee members, DER officials are confident the dredging won't harm either the Barge Canal or Sykes Creek, which is connected to the canal just north of SR 528.

"It looks like they're taking every precaution to protect the Barge Canal and Sykes Creek," Miller added.

USBI plans to protect against chemicals used at the plant reaching the creek by cleaning up any spills with a vacuum-like machine, Miller said. As a result, he said there's a remote chance any chemicals will be spilled in the canal.

And the ships that carry the boosters will use special equipment to protect against oil and gas spilling into the canal, Miller said.

Smith said other environmental measures by USBI include:

- * USBI won't put the dredging material onto any wetlands, that provide a natural filtering process for nutrients in water runoff.

- * USBI is considering using an air bubble system to raise the Barge Canal's oxygen level, which Smith contends is already below state standards.

- * The barges that carry the boosters won't use any paints containing copper, which also is a problem in the canal.
(TODAY, 12-16-82, p. 2B)

<> Attorneys wrapped up closing arguments and jurors deliberated for a few hours Wednesday on whether two NASA subcontractors and three of their employees inflated labor and equipment costs.

The 12 jurors are to resume considering the 10 charges, four weeks of testimony and more than 200 exhibits at 8:30 a.m. today.

On trial are Capital Communications Corp. and its president, Philip Akwa of Milwaukee; New World Construction Co. and its president, Arthur Boschen of Titusville; and James White, Jr. of Melbourne, a former New World engineer.

The men also have been accused of conspiring to charge NASA for excessive labor and equipment costs and planning to withhold information from NASA concerning agreements between the companies.

Defense attorneys contend government officials do not know how much the work should have cost in the first place.
(TODAY, 12-16-82, p. 2B)

December 18: It was 20 seconds of Christmas cheer for NASA engineers Saturday morning as they throttled the Shuttle Challenger's three main engines. The test firing was "a resounding success," said Al O'Hara, director of Shuttle launch operations.

It was the last big test in the preparation of the Challenger for its mission in late January. The new engines on the new Orbiter never had been test fired together.

Final results of the punctual 11 a.m. test should be ready by noon Wednesday after technicians crawl through the 7-foot-wide engine cavities and assess any damage. By then NASA officials in Washington will set a date for liftoff.

At this stage, NASA expects a launch no earlier than January 27.

O'Hara said results were so encouraging that Challenger's five-day mission could be extended a few days.

For NASA brass including General James Abrahamson, a NASA associate administrator watching in the Shuttle firing room, the test was handled no differently than a launch.

Although there were no astronauts in the cockpit, there was plenty of engine roar and mashed potato-like smoke that flooded launch pad 39A.

A now-routine launch countdown began some 56 hours earlier and by late Friday night the service structure that covers the Challenger was moved back.

Early Saturday morning the 15-story fuel tank was filled with 1.5 million gallons of liquid propellant, but only about 60,000 gallons were used in the test firing.

During launch the Challenger's engines will operate eight minutes.

At first glance the Challenger's three engines are no different from the Columbia's. But they do provide 4 percent more thrust -- about 390,000 pounds per engine.

Aside from putting the engines through their paces, the Flight Readiness Firing also tested the new lightweight fuel tank. Weighing about 67,000 pounds, it's 10,000 pounds lighter than its predecessor.

On January 10, engineers will conduct a simulated countdown and launch with astronauts Paul Weitz, Karol Bobko, Donald Peterson and Story Musgrave. (TODAY, 12-19-82, p. 1A)

December 20: Allegations that Rockwell International Corp. diverted funds from the civilian Space Shuttle program to develop the B-1 bomber have sparked an investigation by Congress and the Pentagon, according to a published report.

The investigation is aimed at learning whether the alleged practice contributed to nearly \$5 billion in cost overruns on the Space Shuttle and unrealistically low cost estimates for the B-1, according to sources quoted in Sunday's editions of the Chicago Tribune.

But Lt. Col. William T. Cooper, the Pentagon's public affairs officer for the B-1, said in a telephone interview Sunday he was not aware of any investigation into Rockwell or the allegations.

According to the Tribune, the reason for the inquiry comes from hundreds of timecards showing that after President Carter ordered the B-1 program halted in 1977, Rockwell executives simply kept engineers working on the bomber while billing their salaries to the Shuttle.

Former Rockwell employee Ray Sena supplied the records, the newspaper said. Sena was fired in 1979 after he provided timecards, travel vouchers and evidence to the FBI showing irregularities in other programs, including billing costs of military satellites to the Shuttle, it said.

The names of several mid-level management Rockwell supervisors are listed in a Pentagon investigative report which says they gave depositions acknowledging participation in charging the Shuttle account for work done on the Havstar Global Positioning System, a navigational satellite. (TODAY, 12-20-82, p. 12A)

December 21: Failed efforts to woo Merritt Island residents has United Space Boosters Inc. -- makers of the Space Shuttle's solid rocket boosters -- looking at an undisclosed alternative Brevard County site, USBI vice president Frank J. Lavacot said Monday.

USBI's year-long pursuit of a 130-acre north Merritt Island plant site has been met with community outcries, which culminated last week when protesters donned gas masks and shouldered anti-cancer placards. Homeowners' foremost complaint is the proposed on-site storage of chemical and hazardous wastes.

While USBI hasn't ruled out the undeveloped Merritt Island parcel adjacent to Kennedy Space Center, the firm is negotiating an option on another county location, Lavacot said. He would not identify the location except to say it is one the company considered about a year ago. Negotiations have been continuing for about two weeks, he said.

The only other Brevard County site publicized by USBI officials is in the Titusville-Cocoa Airport Authority's part of Gateway Center Industrial Park.

Ti-Co officials say they have not been contacted. (TODAY, 12-21-82, p. 1B)

<> Four days after they began deliberating, a federal jury returned guilty verdicts Monday against two NASA contractors and three men charged with inflating labor and equipment costs in a complicated scheme of fraud and deceit.

The jurors, who began their deliberations at noon Wednesday and broke for the weekend, had a 10-count indictment, four weeks of testimony and 200 exhibits to consider. At 11:38 a.m. Monday, after 20 hours and 17 minutes of deliberations, they returned to the federal courtroom in Orlando with 36 guilty verdicts and one of innocence.

The verdicts:

- * New World Construction of Titusville and its president, Arthur Boschen, each guilty on seven counts of making false statements to the U.S. government.

- * Former New World employee James T. White, Jr., of Melbourne, guilty on two counts of making false statements and innocent of conspiracy. A third charge of making false statements was dropped.

- Capital Communications Corp. of Milwaukee and its president, Phillip Akwa, each guilty on eight counts of making false statements and one count of making a false claim.

- Akwa and Boschen each guilty of conspiring to defraud the government.

Each count carries a maximum penalty of five years in prison, a \$10,000 fine or both.

Boschen's attorney said the case would be appealed. Attorneys for Akwa and White said a decision to appeal in the 11th Circuit Court of Appeals in Atlanta has not been made, but that one is likely.

Frank Gimbel, the Milwaukee attorney representing Akwa and Capital, said he intends to ask the judge to dismiss the jury's decision or at least grant a new trial because of some procedural problems in the trial.

"It was a very complicated case," Gimbel said. "I question whether the jurors understood it. It's very difficult to beat the United States of America."

Assistant U.S. Attorney Edwin Tomko of Washington, D.C., who prosecuted for the government, said he expects District Judge John Reed, Jr., to hand down sentences within 45 days.

The men and their companies were indicted in January at the end of a three-year investigation into their activities from 1975 to 1979.

Ten more charges against Akwa and Capital are still pending. A trial has not be scheduled yet. (TODAY, 12-21-82, p. 1B)

December 24: The first American woman to fly in space said she would like to consult her Soviet counterparts before making the trip in April. But Shuttle astronaut Sally Ride said, "the lines of communication are not open."

Speaking near launch pad 39A Thursday, Ride said she has had no contact with either Valentina Tereshkova /or/ Svetlana Savitskaya, the world's first two women astronauts.

When asked what she would ask the Russians, Ride, 31, said she "wasn't sure" but added her curiosity is picqued. "We don't know what they did on their flights."

Soviet aerospace secrecy and less-than-perfect relations between the two countries have limited the exchange of ideas between astronauts and cosmonauts.

"We've seen what you've seen," said Bob Crippen, pilot of shuttle Columbia's maiden voyage who will return to space as commander of the April mission.

Ken Pedarson, NASA's director of international affairs, said while Ride hasn't made any specific request to speak with the Soviet women cosmonauts, he said it could be arranged from our end, providing it's not "a publicity stunt." He also cautioned, "We don't know what the Soviet rezponse would be."

Said Pedarson, "The U.S. clearly is not going to go out of its way. Given the political situation, we are not encouraging our astronauts to call the cosmonauts. We would have to ask, what is the objective of such a conversation."

Crippen said he doesn't view competition between the two countries "as a race anymore."

But he cautioned against "sitting back on our laurels. The Soviets have an active program, they've held records," he said referring to the record 211 days in space spent on Salyut 7.

Crippen and Ride were joined by crew members Frederick Hauck and John Fabian at Kennedy Space Center for simulated, computerized liftoff and landing of the Shuttle Challenger.

The April mission, the seventh Shuttle flight and the second for the Challenger, will be the first co-ed American space flight but Ride said she's confident the Shuttle can accommodate the mixed crew.

"There's plenty of room," Ride said. "...The Shuttle was designed to carry men and women and I see no problem with that."

Quipped Crippen, "She gets her own sleeping bag."

A fifth crew member, Dr. Norman Thagard, was named Tuesday to conduct medical tests to collect information on space sickness.

"He (Thagard) won't treat us, but he will investigate the mechanisms in the body that cause space sickness," said Crippen, who emphasized the doctor won't be drawing any blood.

During the April mission, the astronauts will deploy two communication satellites into space and they plan to make the first landing at the space center's 3-mile-long runway.

Crippen said although a spacewalk isn't planned for the mission, Thagard and Fabian would make the venture into the Challenger's cargo bay if the planned spacewalk on this upcoming mission was cancelled. (TODAY, 12-24-82, p. 1A)

<> So far the transition to a single contractor to operate Kennedy Space Center has posed no surprises for either the engineers on the job, their bosses or the powerful unions known for calling strikes in the past.

Although space center employees expect as many as 200 layoffs in 1983, sources say most of those layoffs will be in mid-and-upper-level management positions as EG&G Inc. streamlines the KSC bureaucracy.

Jim Dubay, EG&G general manager at KSC, predicted no layoffs until after the first quarter of 1983.

"It's too early to tell when there would be layoffs. The first quarter is premature. It takes a while to get a lay of the land."

EG&G, a Wellesley, Massachusetts, engineering and weapons firm, will assume the responsibilities of 14 contractors starting January 1. The company in November submitted a successful bid of \$193 million to operate the space center, beating out larger incumbent contractors, Boeing Services and Wackenhut Services.

Although as many as 7,000 people have applied for space center jobs -- including security, fire control, heavy equipment and janitorial positions -- priority will be granted to those already doing the work under the incumbent contractors, Dubay said.

And there have been as many as 4,000 applicants from outside the space center, said Jack Story, EG&G director of advanced projects. "About 80 percent are from this area. They already have jobs but they're looking for something better and there are some from as far away as Connecticut and Texas."

Throughout the week, job hunters crowded into the suite of EG&G offices on U.S. 1 in Cocoa. Traffic was so heavy at times that police were needed to manage the flow. Although many won't be hired, the firm will compile a computerized list of potential recruits.

"As of Thursday night, EG&G hired 1,300. Altogether we should have 1,800." Story said.

The powerful International Association of Machinists represents about 500 people involved in the change of contractors and local union chief Roger Kendrick said he has no complaints.

"The union and EG&G have excellent relations. Their desire and ours is for a smooth transition," Kendrick said.

The machinists union struck Boeing in 1971, 1978 and 1981, and sources close to KSC say many in the union believe those strikes were divisive and they welcomed the new contractor.

Kendrick predicted most of the layoffs under the new contractor will be in management as EG&G "tries to do away with a lot of the redundant paper work."

He also said those laid off would be the first considered for employment if EG&G needs personnel. Collective bargaining between the union and EG&G is expected in January, said Kendrick.

One area that first may feel the impact of the new space center contractor is security, previously contracted to Wackenhut, which teamed with three other firms to compete for the overall operations contract.

Most of the present security guards will be hired by EG&G but the operation will get tighter, said Story.

Space center sources said NASA Administrator James Beggs and Shuttle program Director General James Abrahamson chose EG&G because of the firm's expertise in operating military facilities like the Nevada nuclear test site and the Naval Weapons Center at China Lake, California. (TODAY, 12-24-82, p. 1B)

December 28: The tracking satellite destined for a trip into Earth orbit from the Space Shuttle Challenger was moved to launch pad 39A Monday.

The 5,000-pound NASA satellite was hoisted to a specially designed changeout room at the top of the pad near the Shuttle.

By January 8, the satellite will be loaded into the 60-foot-long cargo bay, said Mark Hess, NASA spokesman.

Work at the pad this week will include a check of the satellite's electrical and computer systems, Hess said. The satellite, called a TDRS, for tracking and data relay system, is attached to a rocket that will propel it to a height of 22,000 miles -- far beyond the Shuttle's reach -- after it leaves the Challenger.

Launch of the Challenger still is set for no earlier than January 27. NASA officials said they will announce a firm date early next month. (TODAY, 12-28-82, p. 12A)

December 29: With EG&G Inc's takeover of operation and maintenance at Kennedy Space Center, some KSC employees are waiting to see if they'll be toasting in the New Year with champagne or with beer.

The Massachusetts firm has promised to "make every effort" to hire incumbent space center workers. But it was awarded its three-year \$193 million contract by promising to cut costs -- and jobs.

As many as 200 employees of 14 contractor companies at KSC could be out of work by 1983. But officials at some contract companies replaced by EG&G believe EG&G may need more workers than it had originally planned.

"We think they'll be hiring more people as they find out what the problems actually are," said an executive at one contractor company, who asked not to be identified. "At least we're hoping that."

Meanwhile, some companies will be meeting this week with EG&G in Arlington, Virginia, to negotiate subcontracts with the engineering and weapons firm.

"The only contact we've had is a letter of intent (from EG&G) for them to subcontract with us," said Al Nelson, project manager at Atlantic Technical Services Inc., which handles mail. "We'll be going to Arlington (this) week to meet with them to negotiate."

Nelson said Atlantic Technical will begin negotiating for 38 employees -- the number it has working at KSC. "They'll put their figure on the table and we'll probably come up with something in between," Nelson said.

"Right now, most companies are in a state of waiting. You have to sit down with (EG&G) eyeball to eyeball," he added.

Other companies said last week they hadn't been contacted by EG&G and will probably not be asked to subcontract.

"We haven't heard from them. There are no plans for us, apparently," said Robert Thompson of Planning Research Corp., which has done some design engineering for the space shuttle program. Thompson said his company has about 875 employees at the space center, and predicted that many will be hired by EG&G.

Still other companies' duties will be handled "in-house" by EG&G, automatically putting them out of the running for a major subcontracts.

"We offered our services, but they decided to do it themselves," said Frank Kelly, medical director for Pan Am's medical services and environmental health at the center. "We may work some small contracts, but they've already hired a medical director."

Kelly said he felt "a good many" of Pan Am's 120 employees at the center will be picked up by EG&G. "But I'm sure it won't be 100 percent," he added.

"They're not talking to us, and we're not talking to them," said Godfrey Bottomly of Boeing Services International, which handles ground services and transportation services at the center.

Insiders say that the smaller contractors at the space center stand the best chance of subcontracting with EG&G. Also, EG&G has pledged to use small and minority dominated companies for subcontracting.

Under its contract with EG&G, NASA expects to trim \$20 million annually of the \$100 million per year it now takes to operate and maintain the space center.

EG&G officials aren't saying much about the whole process, but they insist they'll be ready to take over operations January 3. The company will provide 1,800 jobs at the space center, and officials say about 1,700 have been hired so far.

Peter Chapsky, a spokesman for EG&G at the company's headquarters in Massachusetts, said company officials are in Brevard making an "intensive study" with NASA on hiring necessities at the space center.

He confirmed that EG&G has a commitment to hire employees already at the space center. (THE TRIBUNE, 12-29-82, pp. 1A & 3A)

- <> Jack Swigert, the former astronaut who died of complications from cancer, was hailed Tuesday as a "genuine, home-grown hero" who survived an explosion in space and narrowly missed his goal of serving in Congress.

Swigert died in Washington Monday night at the age of 51, a week before he would have taken the congressional seat he won in the November 2 election. (TODAY, 12-29-82, p. 1A)

- <> The plot continues to thicken in the proposed move of United Space Boosters Inc. to northern Merritt Island.

State environmental officials say USBI's proposed facility will require an air emission permit to operate, although corporate executives originally said they needed no permits to vent various chemical substances into the air.

Among the chemicals that would be vented are perchlorethylene, methylene chloride and 1,1,1-trichloroethane.

Chuck Collins of the Florida Department of Environmental Regulation's Orlando regional office says any new facility

such as the one USBI plans for Merritt Island "definitely" needs an air emissions permit from DER.

Failure to obtain the permit carries a fine of \$10,000 each day the violation persists, Collins says.

Collins notes that the present USBI operation at Kennedy Space Center is among the last of the space center's sources of air emissions not to have applied for a permit.

But Collins also says determining maximum allowable levels of emissions for USBI will be largely "a judgment call," since specific standards have not been established for the substances that would be released into the air.

"When we get the permit application we'll take a look at it," Collins said.

USBI recently stated it did not know what concentration of methylene chloride it was presently releasing into the air. A study conducted three years ago showed a perchlorethylene concentration of about 10 parts per million.

According to Collins, drycleaners in the Orlando area are presently permitted to release perchlorethylene in concentrations up to 100 parts per million.

A draft report issued by the Office of Toxics Integration of the federal Environmental Protection Agency indicates that at least two of the three major substances used by USBI -- perchlorethylene and 1,1,1-trichloroethane -- have been found to be cancer-causing. Evidence is still being evaluated on the carcinogenicity of methylene chloride.

Company executives earlier denied that the chemicals were suspected carcinogens.

One chemical, 1,1,1-trichloroethane, is also suspected of causing depletion of the ozone layer high in the earth's atmosphere. Ozone depletion is believed to cause an increased rate of skin cancer due to the atmosphere's reduced ability to block harmful radiation coming from space. (THE TRIBUNE, 12-29-82, pp. 1A & 3A)

December 31: Jim Dubay has been named president and general manager of EG&G Florida Inc., the company that will begin operating the Kennedy Space Center at midnight on Saturday.

EG&G Florida is the newly formed division of EG&G Inc., the Wellesley, Massachusetts, high-technology firm selected by NASA to run the Space Center -- a job previously performed by 14 separate contractors.

Dubay is the former general manager of EG&G Idaho National Energy Laboratories. His staff at the headquarters in Cocoa will consist of four general managers: Bob Parnell, programs and budget; John Pruden, operations and maintenance; Harold Gray, engineering; and Jackie Cooper, administrative services.

Four other key directors are: Tom Sanford, security services; Bill Yurowsky, reliability and quality service; Jim Walton, industrial relations; and Dr. James Culver, medical director.

Culver and Gray are former Space Center staff members. The other executives were transferred to Florida from EG&G operations in Idaho, Nevada and New York. (TODAY, 12-31-82, p. 12C)

Appendix A

1982 NASA LAUNCH RECORD

Date	Payload	Launch Vehicle	Launch Site	Mission Remarks
January 15	RCA-C	Delta	ESMC*	RCA communications.
February 25	Westar-IV	Delta	ESMC	Western Union communications.
March 4	Intelsat V-D	Atlas Centaur	ESMC	Intelsat communications.
March 22	OSS-1	STS-3	KSC**	Office of Space Science.
April 10	Insat 1-A	Delta	ESMC	India communications.
June 8	Westar-V	Delta	ESMC	Western Union communications.
June 27	DOD 82-1	STS-4	KSC	Department of Defense.
July 16	Landsat-D	Delta	WSMC***	NASA earth resources applications.
August 26	Telesat-G(Anik-D1)	Delta	ESMC	Canada communications.
September 28	Intelsat V-E	Atlas Centaur	ESMC	Intelsat communications.
October 27	RCA-E	Delta	ESMC	RCA communications.
November 11	SBS-C/Anik-C	STS-5	KSC	Satellite Business Systems/ Canada communications.

*ESMC - Eastern Space and Missile Center, Cape Canaveral, Fla.

**KSC - Kennedy Space Center, Fla.

***WSMC - Western Space and Missile Center, Vandenberg Air Force Base, Calif.
(NASA ACTIVITIES, Vol. 13, No. 12, December 1982)

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OF POOR QUALITY